

ROCK PITS

PRELIMINARY ENVIRONMENTAL ASSESSMENT



COCONINO AND KAIBAB NATIONAL FORESTS

USDA Forest Service

June 2013



COMMONLY USED ACRONYMS AND ABBREVIATIONS

AZDFG	Arizona Game and Fish Dept.	NFS	National Forest System
BMP	Best Management Practices	NFSR	National Forest System Road
CEQ	Council on Environmental Quality	NHPA	National Historic Preservation Act
CFR	Code of Federal Regulations	NRHP	National Register of Historic Places
DAU	Data Analysis Unit	OHV	Off-Highway Vehicle
DBH	Diameter at Breast Height	PAC	Protected Activity Center
ESA	Endangered Species Act	R ₃	Region 3 (Southwest Region)
FSH	Forest Service Handbook	ROS	Recreation Opportunity Spectrum
FSM	Forest Service Manual	SHPO	State Historic Preservation Office
GIS	Geographic Information System	SS	Sensitive Species
HUC	Hydrologic Unit Code	T&E	Threatened and Endangered
ID Team	Interdisciplinary Team	TCP	Traditional Cultural Property
MA	Management Area	USDA	United States Dept. of Agriculture
MIS	Management Indicator Species	USDI	United States Dept. of the Interior
MSO	Mexican Spotted Owl	USFWS	United States Fish and Wildlife Service
NDIS	Natural Diversity Information Source	WCP	Watershed Conservation Practice
NEPA	National Environmental Policy Act	WIZ	Water Influence Zone
NFMA	National Forest Management Act	WUI	Wildland-Urban Interface

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Chapter 1.

Purpose of and Need for Action

The Coconino and Kaibab National Forests have prepared this Environmental Assessment (EA) on the potential environmental effects of proposed activities throughout the two national forests, in compliance with the National Environmental Policy Act (NEPA) and other relevant federal and state laws and regulations.

1.1 PURPOSE AND NEED FOR ACTION _____

There is a need to maintain rock surfacing on unpaved roads throughout the Coconino and Kaibab National Forests to facilitate safe driving conditions and provide adequate drainage to minimize erosion in moderate and high traffic areas. There are currently existing sources of surface rock throughout the two national forests, but current sources are limited and need to be reviewed for potential future use. The purpose of this project is to identify and consider the establishment and ongoing use of rock sources over the next 20 years. This will allow for road maintenance and improvements for operational efficiency and resource protection in a cost effective manner.

A baseline geotechnical study (Ninyo & Moore 2011) has been completed identifying the potential locations on both the Coconino and Kaibab National Forests of several rock sources that can be used to put rock surfacing (gravel) on the main travel routes without nearby operational rock quarries. The information in this report, combined with information on the locations of existing rock sources will be used to identify potential rock sources throughout the Forests. These potential sources will be considered based on a review of known sensitive resources and operational feasibility to develop a proposed action for analysis.

This project will implement the Forest Management Goals as stated in the Coconino and Kaibab Land and Resource Management Plans (also referred to as Forest Plans), which includes direction to:

1. Conduct geological investigations of aggregate material sources for project planning and for road construction maintenance (Coconino LRMP, p. 78).
2. Administer the mineral laws and regulations to minimize adverse surface resource impacts. Support sound energy and minerals exploration and development (Kaibab LRMP, p. 19).
3. Restrict or prohibit surface use in areas with habitat of threatened and endangered and sensitive plant and animal species, and heritage resources nominated or posted to the National Register (Kaibab LRMP, p. 50).

Implementing the project will provide a source for sand, gravel, and aggregate materials to the Coconino and Kaibab National Forests that is local, economically feasible, and of the required quality.

1.2 PROPOSED ACTION

The Coconino and Kaibab National Forests (Figure 1) propose to develop and operate up to 39 material pits to provide cinders, gravel, and other aggregate materials for surfacing of unpaved roads for maintenance purposes. Rock sources would be established over the next 20 years based on the need for temporary road construction, maintenance of existing roads and availability of budget resources. Road surfacing materials would be used to create safe driving conditions and provide adequate drainage to minimize erosion from roads to nearby streams and meadows. Nineteen of these pits are on the Coconino National Forest and 20 are on the Kaibab National Forest. Approximately 14 of these 39 pits would be new pit locations. Of the remaining 25 pits, 18 would require an expansion to the existing disturbance footprint. More detail on the size of existing and proposed pits and expansion area are presented in *Chapter 2 - Alternatives*.

1.3 DECISION FRAMEWORK

The Forest Supervisors of the Coconino and Kaibab National Forests are the Responsible Officials, who will decide which actions, if any, to implement. This decision will be based on:

1. Whether the proposed activities and alternative address the issues, are responsive to national policy/guidance and direction in the Forest Plan, as amended, and meet the purpose of and need for action on the Coconino and Kaibab National Forests.
2. Whether the information in this analysis is sufficient to implement proposed activities.
3. Whether the proposed activities would have significant effects and therefore required the preparation of an Environmental Impact Statement.

If an action alternative is selected, project implementation could begin in the first quarter of 2012. Most actions would be accomplished within 20 years.

1.4 PUBLIC INVOLVEMENT

The NEPA process and the associated Forest Service implementing regulations provide for an open public involvement process. The NEPA phase of a proposal begins with public and agency scoping. Scoping is the process used to identify major issues and to determine the extent of environmental analysis necessary for an informed decision to be made concerning a proposed action. Issues are identified, alternatives are developed, and the environmental analysis is conducted and documented.

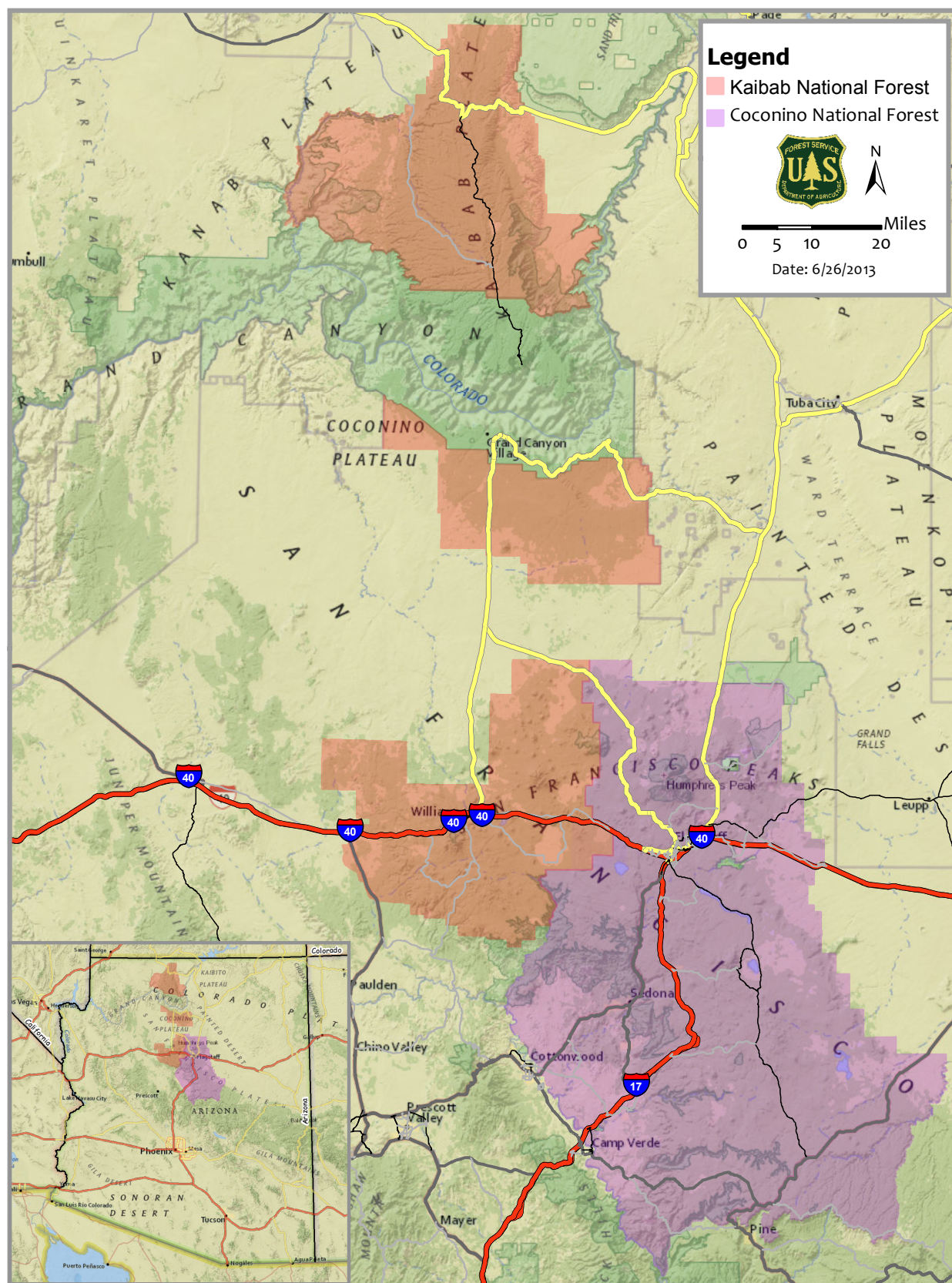


Figure 1. Coconino and Kaibab National Forests Location Map.

The public scoping process began April 5, 2011 when the scoping letter was mailed. One scoping public meeting was held in Flagstaff on April 25, 2011 to gather public comments on the Proposed Action. Nine people attended the scoping meeting. The scoping period ended on May 6, 2011, however, several comments were received after that date. All comments received to date are included in the content analysis.

Public outreach, meeting notices and advertisement included:

The posting of legal notices in the Arizona Daily Sun in Flagstaff and the Red Rock News in Sedona

1. Email of the scoping notice to 77 people, groups and agencies
2. Mailing letters to 672 people, groups and agencies
3. Mailing letters to 23 tribes to request tribal consultation
4. A news release that was sent to the local media
5. Posting a notice on the US Forest Service website

This scoping report presents the results of a content analysis completed on the comments. Content analysis is a process that identifies specific, separate statements within each submitted comment and categorizes them. These categories will be used to help frame the public issues for consideration and further refine the proposed action and developing alternatives for the Environmental Assessment.

The scoping process generated 2 letters from agencies, 19 filled-out comment forms from individuals, 5 phone calls (4 from individuals and 1 from an organization). The clear majority of comments were from individuals. The comments are in the administrative record for this project.

This Environmental Assessment is subject to predecisional objection regulations under 36 CFR 218 as it discloses impacts of a project or activity implementing the Coconino and Kaibab national forest land management plans and is not authorized under the Healthy Forest Restoration Act. According to 36 CFR 218.5, all interested and affected parties who provided written comment as defined in § 218.2 during scoping or the comment period will be eligible to participate in the objection process. A legal notice establishing the 30-day comment period on this preliminary EA will be published in the Arizona Daily Sun. The opportunity to comment ends 30 days following the date of publication of the legal notice in the newspaper of record.

1.5 ISSUES

Issues are points of discussion, debate, or dispute about environmental effects that may occur as a result of the proposed action or an alternative. It is these potential environmental effects, particularly potential negative effects, which provide focus for analysis, influence alternative development, and lead to development of mitigation measures. Issues are used to display differing effects between the proposed action and the alternatives regarding specific resource elements.

A list of potential issues was developed by the project interdisciplinary (ID) team on the basis of their knowledge of the Proposed Action and the area affected, and the public comments submitted during scoping.

These “potential issues” are reviewed to determine: a) the significant issues to be analyzed in depth, and b) issues which are not significant or which have been covered by prior environmental review and, therefore should be eliminated from detailed analysis. Four significant issues were identified. Design features were developed to ensure the protection of natural and cultural resources.

1.5.1 IMPACTS ON WALNUT CANYON NATIONAL MONUMENT

The National Park Service Flagstaff Monuments staff is concerned that development of the Young’s Canyon pit could result numerous impacts within or around the National Monument. Potential impacts could include:

1. Cumulative effects to the Monument from the combination of the proposed quarry operations and a shooting range that is under development within 1 1/2 miles from the monument. There could be cumulative effects from noise and vehicle traffic, seismic vibrations from heavy equipment and general disturbance to the area.
2. Impact from the development and operation of the Young’s Canyon Quarry on a nearby golden eagle nesting site.
3. Impact from the development and operation of the Young’s Canyon Quarry on prime pronghorn habitat, particularly during fawning season.
4. Impacts from seismic vibrations from blasting and heavy equipment operations to sensitive archeological structures that have standing architecture and are located between 2 and 3 miles from the quarry.

1.5.2 RECLAMATION OF EXISTING PITS

Some pits were evaluated for expansion or continued use but were not included in the original proposed action for a variety of reasons. Some of these pits would benefit from reclamation actions. Reclamation actions could include noxious weed treatments, reshaping pit walls and planting native vegetation. These pits could be cleared for reclamation but the reclamation actions would not be required or connected to the use of other pits.

1.5.3 IMPACTS TO MEXICAN SPOTTED OWL RESTRICTED HABITAT

The Thomas proposed rock pit identified in scoping was found to overlap with habitat identified as target/threshold habitat for the Mexican spotted owl. Target/threshold habitat was modeled for the area as part of the Four Forest Restoration EIS. This means the original location of the proposed Thomas pit is in an area to be managed for habitat elements important to support owl populations. As a result the Thomas pit was replaced with the proposed Thomas 2 pit, which is located outside of owl target/threshold habitat.

1.5.4 EROSION AND GENERAL WILDLIFE IMPACTS FROM THE DEVELOPMENT OF THE PROPOSED HOSTETTER PIT

The Hostetter Tank pit was proposed in scoping and located off of Forest Road 418 along a spur road named 419C. The pit location was identified based on the 2007 Ninyo and Moore mineral materials report written for the Coconino National Forest. Inspection of the site; however, revealed that while the site included a basalt outcrop with good potential road surfacing material, access to the proposed pit was along an ephemeral drainage, which would require extensive reconstruction of the route for hauling purposes. In addition, comments identified the area as an important for viewshed, elk migration and cover, and recreation.

As a result of these issues, the Hostetter Tank proposed pit was replaced with a much smaller pit named the Hostetter 2 proposed rock pit. This pit is located approximately one mile east of the Hostetter Tank proposed pit, but is at the site of an existing borrow pit along Forest Road 418. The re-location of the pit would address the potential soil and water issues from the presence of a drainage at the Hostetter Tank pit location, and is expected to greatly reduce potential impacts to visual resources, wildlife, and recreation. Impacts of the Hostetter 2 and Thomas 2 pits are fully analyzed as part of both action alternatives.

Chapter 2. Alternatives

This chapter describes and compares the No Action, Proposed Action and an alternative to the Proposed Action to be considered in this analysis. It includes a description of each alternative considered. This section also presents a summary comparison of the effects of the alternatives based on the issues, defining the differences between each alternative and providing a basis for choice among options by the decision maker and the public. The Proposed Action was developed to respond to the purpose and need, and is fully compliant with the Forest Plan.

2.1 ALTERNATIVE A - NO ACTION _____

Under Alternative A (No Action), none of the 39 material pits would be developed and operated to provide cinders, gravel, and other aggregate materials for surfacing of unpaved roads for maintenance purposes. Existing rock sources would be used to for temporary road construction and maintenance of existing roads. Because road surfacing materials are currently limited, temporary road construction and maintenance of existing roads would be more expensive due to the expensive of long hauls and need to purchase materials commercially.

2.2 ALTERNATIVE B - PROPOSED ACTION _____

The Proposed Action directly addresses the purpose and need of this project by establishing rock sources for the next 20 years. This would allow for road maintenance and improvements for operational efficiency and resource protection in a cost effective manner.

Baseline geotechnical studies (Ninyo and Moore 2011) and a survey of existing and potential material pits were completed to identify potential rock pit sources appropriate for development to help maintain roads on both the Coconino and Kaibab national forests. Based on these reviews, and a review of other existing rock sources for road materials, approximately 39 pit locations have been identified. Nineteen of these pits are on the Coconino and 20 are on the Kaibab National Forest. Approximately 13 of these 39 pits would be new pit locations. Of the existing 26 pits, 20 would have an expansion to the existing disturbance footprint. More detail on the size of existing and proposed pits and expansion area are included in Table 1, below. The locations of the pits are included in Figures 2 and 3.

Table 1. Alternative B - Proposed Action Rock Pit Sites and Expansion Areas.

Pit Name	Existing pit?	Pit Size (acres)	Existing Pit Area (acres)	Expansion or New Disturbance Area (acres)	National Forest
222 Pit	Yes	12.9	12.9	0.0	Coconino
Big Aso	Yes	9.4	9.4	0.0	Kaibab
Big Draw	Yes	4.7	1.9	2.8	Coconino
Big Ridge	Yes	8.2	6.2	2.0	Kaibab
Buck Butte	Yes	14.5	5.8	8.7	Coconino
Bushy Knoll	No	13.8	0.0	13.8	Coconino
Cinch Hook	Yes	18.6	7.9	10.7	Coconino
Crazy Cow	No	14.9	0.0	14.9	Kaibab
Davenport	Yes	15.4	8.5	6.9	Kaibab
Deadhorse	Yes	13.3	5.7	7.6	Kaibab
Dillman	Yes	6.2	3.8	2.4	Kaibab
Dog Knobs	Yes	12.1	11.2	0.9	Kaibab
Double A	Yes	7.1	5.2	1.9	Kaibab
Fitzgerald	Yes	16.8	11.0	5.8	Kaibab
Fues	Yes	9.5	5.3	4.2	Kaibab
Hostetter 2	No	9.7	0.0	9.7	Coconino
Jackass Knoll	Yes	5.4	3.8	1.6	Kaibab
Kaibab Site 1-A	No	13.5	0.0	13.5	Kaibab
Kaibab Site 2-C	No	8.6	0.0	8.6	Kaibab
Kaibab Site 4-A	No	7.6	0.0	7.6	Kaibab
Lockwood	Yes	9.6	4.6	5.0	Coconino
Macks	Yes	5.1	0.5	4.6	Coconino
Marteen	No	7.1	0.0	7.1	Kaibab
Moonset	Yes	23.8	23.8	0.0	Kaibab
Oak Grove	Yes	9.7	4.5	5.2	Coconino
Perry Lake	Yes	6.9	6.9	0.0	Coconino
Pine Hill Cinders	Yes	3.9	2.2	1.7	Coconino
Pittman Valley	Yes	12.0	10.5	1.5	Kaibab
Riordan Pit	Yes	20.9	20.9	0.0	Coconino
Ruin	Yes	11.1	6.2	4.9	Kaibab
Saddle Mtn. Cinders	Yes	6.9	6.9	0.0	Coconino
Salmon Lake	No	10.8	0.0	10.8	Coconino
Smoot Lake	No	11.1	0.0	11.1	Kaibab
Snafu	No	10.7	0.0	10.7	Coconino
Thomas 2	No	19.3	0.0	19.3	Coconino
Turkey Knob	No	7.7	0.0	7.7	Coconino
W Triangle	Yes	13.8	9.5	4.3	Kaibab
Willard Springs	Yes	10.4	8.5	1.9	Coconino
Youngs Canyon	No	11.0	0.0	11.0	Coconino
Totals		434.0	203.6	230.4	



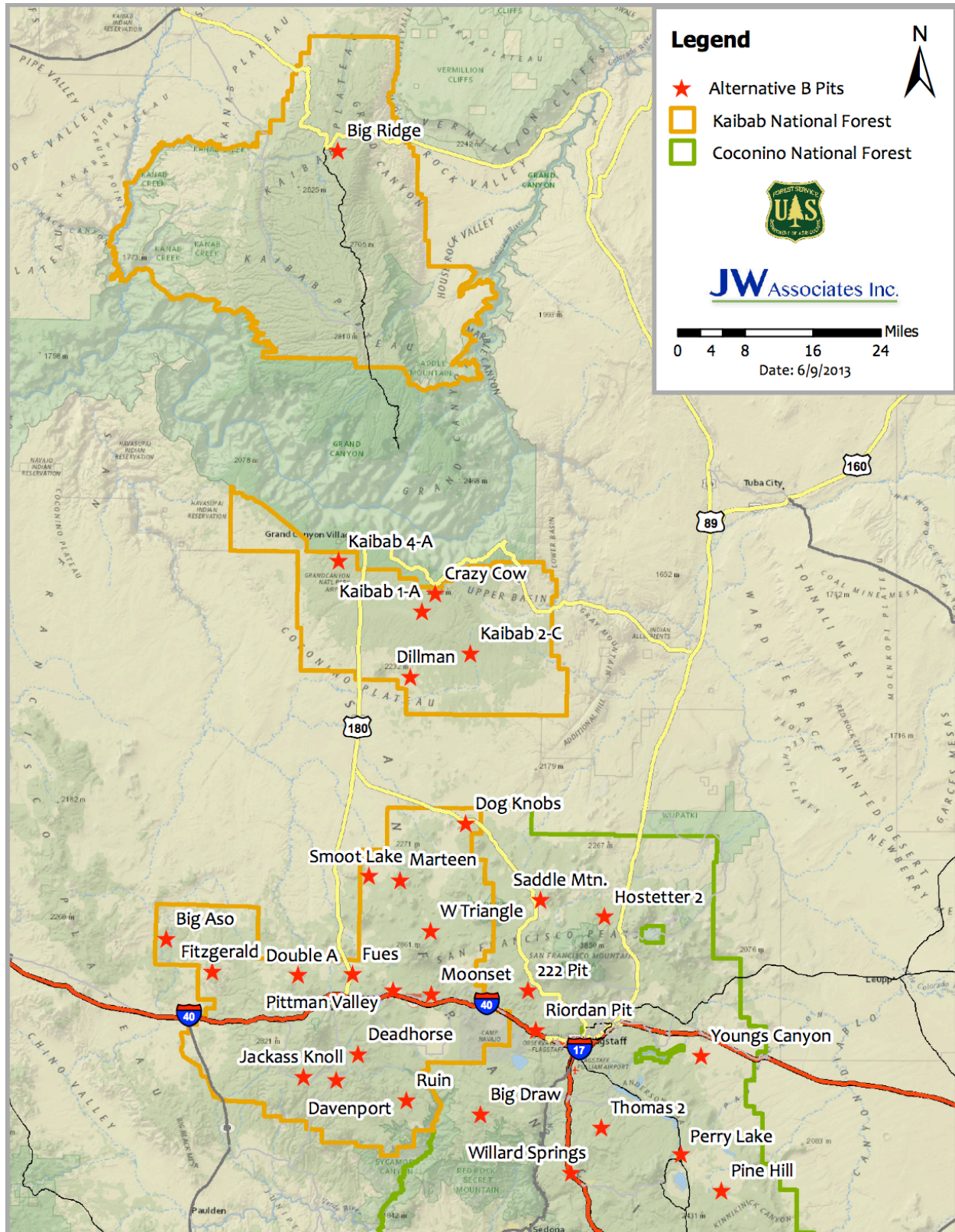


Figure 3. Alternative B - Proposed Action Rock Pit Sites on the Kaibab National Forest.

Development and expansion of rock pits involves disturbance of the surface conditions at the sites. Development would first require the removal of existing vegetation. Then, heavy equipment such as bulldozers, excavators and backhoes would move and stockpile topsoil and overburden onsite. In some instances, where rock outcrops exist or there is an existing pit, vegetation removal and earth moving would be minimal. Vegetation, topsoil, and overburden may be stockpiled in the pit footprint to be used for reclamation.



Figure 4. Curly Pit – Existing Basalt Pit Requiring Earth Moving and Rock Crushing.

Material extraction, processing, and transport will depend on the material at the rock pit. Cinder materials usually require the least amount of processing, and in some instances may be mixed with other materials to make longer lasting road surfacing. Typically, cinders are screened to achieve the desired gradation. Basalt and limestone rock usually requires blasting, crushing, and screening to provide the materials of the size and consistency needed to spread on road surfaces. As a result, the excavation and processing needs often require that pits including basalt or limestone to be larger than cinder pits so that there is adequate space to operate crushing, screening, or other machinery to produce adequate materials on-site.

In addition to space for processing equipment, pits requiring processing will also need space to store stockpiles of processed and partially processed materials. Once fully processed, materials would be loaded by backhoe, conveyer belt, or other equipment to transport the rock to surrounding roads. The space needed for processing equipment, stockpiling of materials, and loading is included in the footprint of each rock pit site.

To minimize transportation costs and impacts to forest resources, most of the pits would be located in easily accessible areas, near roads that serve as key transportation linkages. Most existing and proposed pits are located on an existing road or include an existing access road. In some instances, a temporary road will need to be constructed to provide access to the pit location.

The total disturbance area is estimated at approximately 434 acres (Table 1). Approximately 204 acres of this area is made up of existing and disturbed rock pit sites with approximately 230 acres of new disturbance. Approximately 0.48 miles of temporary roads would be required along with up to 3.25 miles of road improvements (Table 2).

Protection measures designed to address specific resources are part of Alternative B - Proposed Action, and are presented in *2.4 Resource Specific Protection Measures*. Rehabilitation and reclamation of each rock pit would be required once development and material extraction is complete. A preliminary reclamation plan is presented in *2.5 Reclamation Plan*.

Table 1. Temporary Roads, Road Improvements and Materials for Proposed Pits.^{1,2}

Pit Name	Temp. Roads (miles)	Road Imp. (miles)	Comments
222 Pit	0.00	0.00	Basalt material, would need blasting, crushing.
Big Aso	0.00	0.00	Cinder materials.
Big Draw	0.04	0.00	Unknown material. Likely basalt. Existing route, but not a system road.
Big Ridge	0.00	0.00	Basalt cap, limestone underneath. Only crushing/screening needed.
Buck Butte	0.00	0.00	Clayey material & basalt. Material mixed onsite. Active pit used by County.
Bushy Knoll	0.00	0.00	Crushed basalt and some cinders. Little vegetation, burned in Bushy Fire, 1991.
Cinch Hook	0.00	0.00	Requires blasting and crushing.
Crazy Cow	0.00	0.00	Unknown material. Likely basalt.
Davenport	0.00	0.00	Cinder materials.
Deadhorse	0.00	0.00	Active county-operated pit for cinder borrow material.
Dillman	0.00	0.00	Limestone. Crushing needed.
Dog Knobs	0.00	0.00	Cinder materials.
Double A	0.00	0.00	Cinder materials.
Fitzgerald	0.00	0.00	Active cinder pit, used by county.
Fues	0.00	0.00	Cinder materials, requested for use by county.
Hostetter 2	0.00	0.50	Crushed basalt.
Jackass Knoll	0.00	0.00	Cinder and basalt material, would need blasting, crushing.
Kaibab Site 1-A	0.00	0.25	Basalt material, needs blasting, crushing.
Kaibab Site 2-C	0.03	0.50	Basalt material, needs blasting, crushing.
Kaibab Site 4-A alt.	0.04	0.50	Basalt material, needs blasting, crushing. Existing route, but not a system road.
Lockwood	0.00	0.00	Crushed limestone material. No processing needed.
Macks	0.00	0.00	Rim & limestone gravels, no processing. Little vegetation. Area burned in Pot fire.
Marteen	0.00	0.00	Basalt material, would need blasting, crushing.
Moonset	0.00	0.00	Existing cinder pit in use.
Oak Grove	0.00	0.00	Existing cinder pit in use.
Perry Lake	0.00	0.00	Basalt and crushed basalt.
Pine Hill Cinders	0.01	0.00	Cinder materials. Existing route to pit, but not identified as system route.
Pittman Valley	0.00	0.00	Rhyolite materials, currently in use.
Riordan Pit	0.00	0.00	Has been continuously in use for decades, currently heavily used.
Ruin	0.00	0.00	Blasting and crushing would be needed.
Saddle Mtn.	0.06	0.00	Cinder materials. Existing route to pit, but not identified as system route.
Salmon Lake	0.08	0.00	Would need blasting and screening. Existing road to pit site, but not in system.
Smoot Lake	0.00	0.00	Basalt material, would need blasting, crushing.
Snafu	0.00	0.00	Rim & limestone gravels, no processing. Most vegetation burned in Pot fire.
Thomas 2	0.15	0.00	Unknown material. Likely basalt.
Turkey Knob	0.00	1.50	Road to site would need to be improved.
W Triangle	0.00	0.00	Currently active cinder site. Used by Forest Service and county.
Willard Springs	0.00	0.00	Crushed basalt.
Youngs Canyon	0.07	0.00	Existing road, but not on system.
^{1,2} Totals	0.48	3.25	

¹The temporary roads and existing road improvements needed are estimates only.²Table 2 shows the temporary roads needed for Young's Canyon, which is not part of Alternative C.

2.3 ALTERNATIVE C

Alternative C addresses some of the issues raised during scoping by modifying Alternative B - Proposed Action. The Youngs Canyon pit was removed from Alternative C addresses to address the concerns raised by the National Park Service Flagstaff Monuments regarding potential seismic, traffic and wildlife impacts from that proposed pit.

Alternative C addresses the issue of reclamation at existing pits that are not being considered in Alternative B - Proposed Action. Seven pits, covering a total of approximately 115 acres, were identified that would benefit from reclamation activities and have been added to Alternative C (Table 3 and Figures 5 and 6). The reclamation activities at these pits would be implemented as funding becomes available for those purposes.

Alternative C would provide approximately 38 pit locations (Table 4). Eighteen of these pits are on the Coconino and 20 are on the Kaibab National Forest. Approximately 12 of these 38 pits would be new pit locations. Of the remaining 26 pits, 20 would have an expansion to the existing disturbance footprint. The total disturbance area is estimated at approximately 423 acres (Table 4). Approximately 204 acres of this area is made up of existing and disturbed rock pit sites and approximately 219 acres are new disturbance.

Approximately 0.4¹ miles of temporary roads would be required along with up to 3 miles of road improvements (Table 2).

Table 3. Alternative C Existing Rock Pit Sites Proposed for Reclamation.

Pit Name	Pit Size (acres)	National Forest
Cruice Pit	87.5	Kaibab
Little Aso	6.0	Kaibab
Little Pine Flat	4.1	Kaibab
Holloway	4.6	Coconino
Bald Mesa #2	3.2	Coconino
Ashurst Lake	6.8	Coconino
Stoneman Lake	2.4	Coconino
Total	114.6	

Table 4. Alternative C Rock Pit Sites and Expansion Areas.

Pit Name	Existing pit?	Pit Size (acres)	Existing Pit Area (acres)	Expansion or New Disturbance Area (acres)	National Forest
222 Pit	Yes	12.9	12.9	0.0	Coconino
Big Aso	Yes	9.4	9.4	0.0	Kaibab
Big Draw	Yes	4.7	1.9	2.8	Coconino
Big Ridge	Yes	8.2	6.2	2.0	Kaibab
Buck Butte	Yes	14.5	5.8	8.7	Coconino
Bushy Knoll	No	13.8	0.0	13.8	Coconino
Cinch Hook	Yes	18.6	7.9	10.7	Coconino
Crazy Cow	No	14.9	0.0	14.9	Kaibab
Davenport	Yes	15.4	8.5	6.9	Kaibab
Deadhorse	Yes	13.3	5.7	7.6	Kaibab
Dillman	Yes	6.2	3.8	2.4	Kaibab
Dog Knobs	Yes	12.1	11.2	0.9	Kaibab
Double A	Yes	7.1	5.2	1.9	Kaibab
Fitzgerald	Yes	16.8	11.0	5.8	Kaibab
Fues	Yes	9.5	5.3	4.2	Kaibab
Hostetter 2	No	9.7	0.0	9.7	Coconino
Jackass Knoll	Yes	5.4	3.8	1.6	Kaibab
Kaibab Site 1-A	No	13.5	0.0	13.5	Kaibab
Kaibab Site 2-C	No	8.6	0.0	8.6	Kaibab
Kaibab Site 4-A	No	7.6	0.0	7.6	Kaibab
Lockwood	Yes	9.6	4.6	5.0	Coconino
Macks	Yes	5.1	0.5	4.6	Coconino
Marteen	No	7.1	0.0	7.1	Kaibab
Moonset	Yes	23.8	23.8	0.0	Kaibab
Oak Grove	Yes	9.7	4.5	5.2	Coconino
Perry Lake	Yes	6.9	6.9	0.0	Coconino
Pine Hill Cinders	Yes	3.9	2.2	1.7	Coconino
Pittman Valley	Yes	12.0	10.5	1.5	Kaibab
Riordan Pit	Yes	20.9	20.9	0.0	Coconino
Ruin	Yes	11.1	6.2	4.9	Kaibab
Saddle Mtn. Cinders	Yes	6.9	6.9	0.0	Coconino
Salmon Lake	No	10.8	0.0	10.8	Coconino
Smoot Lake	No	11.1	0.0	11.1	Kaibab
Snafu	No	10.7	0.0	10.7	Coconino
Thomas 2	No	19.3	0.0	19.3	Coconino
Turkey Knob	No	7.7	0.0	7.7	Coconino
Willard Springs	Yes	10.4	8.5	1.9	Coconino
W Triangle	Yes	13.8	9.5	4.3	Kaibab
Totals		423.0	203.6	219.4	



Figure 5. Alternative C Rock Pit Sites on the Coconino National Forest.

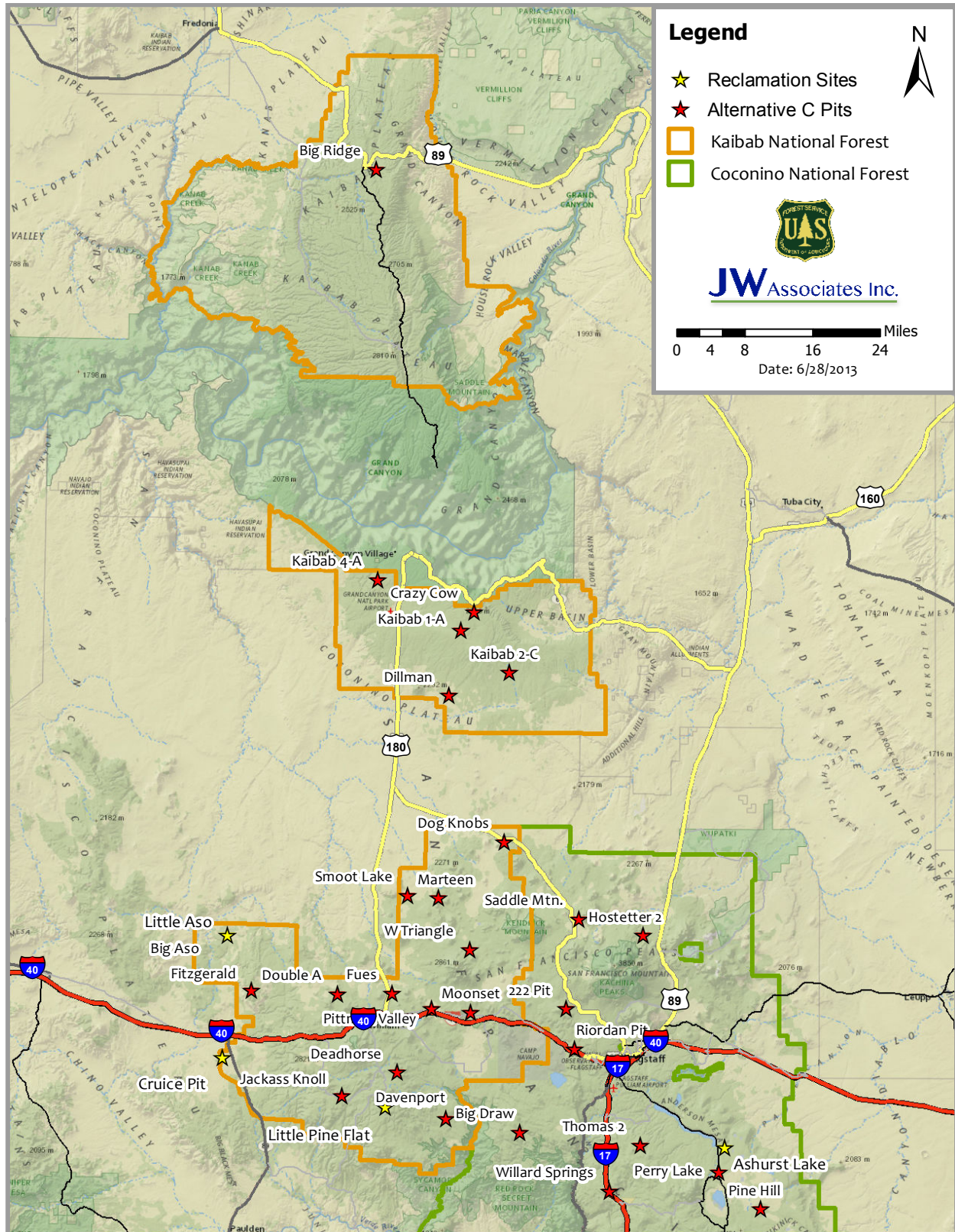


Figure 6. Alternative C Rock Pit Sites on the Kaibab National Forest.

Protection measures designed to address specific resources are part of Alternative C, and are presented in 2.4 *Resource Specific Protection Measures*. Rehabilitation and reclamation of each rock pit would be required once development and material extraction is complete. A preliminary reclamation plan is presented in below 2.5 *Reclamation Plan*.

2.4 RESOURCE SPECIFIC PROTECTION MEASURES ____

To avoid and minimize impacts to the greatest extent possible, rock pit development and operation would follow the following design criteria and best management practices:

2.4.1 AIR QUALITY

1. Trucks hauling materials would be limited to no more than 25 miles per hour on all forest roads, and 10 miles per hour within 0.25 miles of all signed campgrounds and trailheads.
2. All trucks hauling materials must have their loads covered during transport.
3. While in operation, roads will be watered to minimize dust as necessary.

2.4.2 NOXIOUS OR INVASIVE WEEDS

Best Management Practices as outlined in Appendix B of the “Final Environmental Impact Statement for Integrated Treatment of Noxious or Invasive Weeds” (US Forest Service 2005) would be followed to incorporate weed prevention and control into the project. Existing pits would be required to be surveyed for noxious weeds before any project related activities. If infestations are found, they would be treated before new operations would be allowed at those sites.

The following features, from Appendix B of the “Final Environmental Impact Statement for Integrated Treatment of Noxious or Invasive Weeds” (US Forest Service 2005) are those most relevant that are required for project implementation and monitoring:

1. Before ground disturbing activities begin, inspect material sources on site annually (or before disturbance for new sites), and ensure they are weed free before use and transport. Treat weed-infested sources for eradication, and strip, stockpile, and treat contaminated materials before using pit materials
2. Equipment would be inspected and cleaned before entering rock pit areas to prevent introduction of invasive weeds.
3. Soil disturbance would be avoided to the extent practicable.
4. If treatments are not successful or not possible, ground disturbance associated with rock pit sites would be located away from noxious or invasive weed populations to avoid spread.
5. Monitor and treat noxious or invasive weed populations following project implementation annually for at least three years to ensure that any weeds transported to the site are promptly detected and controlled

6. Prevent any new noxious or invasive weed species from becoming established, contain or control the spread of known weed species, and eradicate species that are the most invasive and pose the greatest threat to the biological diversity and watershed condition (Coconino National Forest Plan, p. 23).
 - a. Maintain stockpiled, uninfested material in a weed-free condition.
 - b. Work with the responsible transportation agencies to adopt these practices for maintenance of roads that cross National Forest System lands.

2.4.3 RECREATION AND SOCIAL CONSIDERATIONS

1. For public safety, camping would be prohibited within active rock pit areas.
2. For public safety, signs would be placed at major intersections on hauling routes during periods of active hauling.
3. Prior to blasting activities, landowners within 2 miles of the blasting location would be notified.
4. Crushing, blasting, and hauling activities would be avoided on summer weekends, and the following holidays: Memorial Day, Fourth of July, and Labor Day.
5. Entrances to active rock pit sites would be gated to prevent inappropriate OHV use, dumping, or other activities.

2.4.4 CULTURAL AND HISTORICAL RESOURCE PROTECTION

1. All potentially disturbed areas would be surveyed prior to disturbance activities. All identified cultural resource sites would be flagged prior to implementation. Flagged sites would be fully avoided.
2. Areas where temporary roads would be constructed would be inventoried prior to implementation.
3. Any ground disturbing road re-alignments proposed within the project area will comply with the existing Region 3 Programmatic Agreement with the Arizona State Historic Preservation Officer, dated December 24, 2003, and shall constitute an additional undertaking for Section 106 compliance outside this analysis.

2.4.5 SENSITIVE PLANT PROTECTION

1. Sensitive plant populations would be avoided when constructing temporary roads.

2.4.6 WILDLIFE PROTECTION

General

1. Green tree harvest or snag removal would not occur during the period April 1st to August 15th to avoid potential nest destruction and loss of broods for cavity nesters and passerine birds.

Mexican Spotted Owl

1. Mexican Spotted Owl (MSO) restricted and protected habitat would be surveyed in the disturbance area the year of implementation or one year prior to implementation to determine if any new areas have become occupied by owls.
2. No ground disturbance would occur in known protected activity centers (PACs) within the disturbance area, or within a half mile of nests and roosts during the breeding season.

Northern Goshawk

1. Pit operation and hauling within occupied northern goshawk PFAs may occur when surveys have indicated there are no active nests. If surveys identified an occupied nest, all operational activities and hauling should be avoided March 1 – September 30th.

Turkey

1. Timber harvesting would not occur in turkey nesting areas from April 15th to June 30th.
2. Scattered patches of untreated slash within ½ mile of dependable water would be retained in known or potential turkey nesting areas.

Deer Fawning and Elk Calving Areas

1. Tree removal, blasting, and crushing activities would be deferred from May 15th to June 30th in known fawning and calving areas.

Golden Eagle

1. There is a potential Golden eagle nest located close to the Youngs Canyon site. The nest site would be confirmed in the field before activity would be allowed at that site. Blasting within 0.5 miles of the nest would not be allowed during the nesting season (November 1st to May 1st).

Pronghorn Antelope

1. The Youngs Canyon site is adjacent to pronghorn antelope habitat. Blasting would not be allowed during the pronghorn fawning season (May 15th to June 30th)

Wildlife Cover

1. Maintain hiding cover at least 200 feet around known dependable waters in the area.

2.4.7 SOIL AND WATERSHED PROTECTION

- 1.** Best management practices (BMPs) are designed to prevent or reduce the amount of water pollution generated by non-point sources to a level compatible with water quality goals. BMPs would be incorporated into applicable cutting, burning, and road building activities. Authority and guidance to prescribe and implement BMPs is defined in FSM 2501, 2530, FSH 2509.22 and the Forest Plan.
- 2.** All operators at a proposed rock pit site must obtain coverage under an Arizona Pollutant Discharge Elimination System Permit (AZPDES) and establish and implement a stormwater pollution prevention plan (SWPPP), if required based on the magnitude of the specific rock pit operation.
- 3.** Erosion control work would be kept current immediately preceding expected seasonal periods of precipitation or runoff.
- 4.** There will be no disturbance from mechanical equipment within 50 feet on either side of a designated protected stream course (perennial streams).
- 5.** Refueling and maintenance of project motorized equipment would occur at least 200 feet away from any channel.
- 6.** No more than 500 gallons of fuel would be stored at any one mine location at any given time. Fuel storage containers must be located within a secondary containment area that can accommodate 110 percent of the contents of the tank. All fueling of vehicles will be done on a designated protected, upland site.
- 7.** One 50-gallon spill kit (or two 30-gallon spill kits) must be located on-site during use of all heavy equipment
- 8.** Hauling and use of forest roads would be restricted during wet weather road restrictions
- 9.** No permanent structures would be constructed as part of any rock pit; although at least one self-contained portable toilet is required to be on-site during all operations.
- 10.** Mine pit areas would be designed to be internally draining during mining activity.
- 11.** Soil would be stockpiled in situ and replaced so that the "A" horizon is back on the surface.

2.4.8 SCENERY MANAGEMENT CONSIDERATIONS ALONG ROADS AND TRAILS

- 1.** Consideration would be given to scenery management when cutting is completed along National Forest System trails and roads and along Scenic Highway corridors such as Hwy 180.
- 2.** Treatment areas would be treated or rehabilitated promptly for the protection of scenic values.
- 3.** Standing trees and shrubs would be left in strategic locations along the perimeter of the pit to serve as screening.
- 4.** Two to three foot berms would be constructed with topsoil to create a gradual grade change from the pit to the adjacent road, the berms would be seeded with native grasses to prevent erosion and planted with trees. Berms and tree planting should be located to fill in gaps between trees that are left on the perimeter.

2.5 RECLAMATION PLAN

2.5.1 RECLAMATION OBJECTIVES

Each rock pit will be managed according to the site-specific plan of operations developed and approved for a specific pit. Each plan of operations must include a specific reclamation plan to address the timely reclamation of the pit. The reclamation plans must be consistent with the reclamation plan information included here.

The objective of reclamation is to ensure that the site is left in a condition that:

- 1.** Does not pose a threat to public health and safety;
- 2.** Protects air and water quality; and
- 3.** Protects wildlife habitat and provides for the establishment of indigenous vegetation that would provide a productive end land use as wildlife habitat.

Operation, reclamation, and closure of the rock pits would comply with Coconino County Land Use Regulations, and all pertinent local, State, and Federal laws, rules, ordinances, and guidelines.

2.5.2 RECLAMATION SCHEDULE

Final reclamation would be performed following completion of mineral materials mining at an actively mined site. Where operational conditions permit, reclamation of portions of the site would occur concurrently with mining activity.

For established mine sites with existing disturbance, reclamation activities may not occur according to this reclamation plan. Management or reclamation of existing disturbed areas would occur according to Forest Service regulations and policy 36 CFR 228 Subpart D, Disposal of Mineral Materials. Any development of a rock pit site to provide administrative or recreational facilities would require additional environmental analysis through the National Environmental Policy Act process.

Prior to developing, opening any new site, existing vegetation would be removed. Where trees greater than 12 inches exist, a minimum number of trees greater than 12 inches would be removed and stacked around the edge of the mine site and along the access road for replacement as large woody debris after mining activities. Once vegetation has been removed and stockpiled, the top 3-6 inches of soil would be stockpiled (where topsoil exists) as berms around the edges of the disturbed area.

2.5.3 CONCURRENT RECLAMATION

Concurrent reclamation activities include management of noxious weeds and control of drainage. Any emergent populations of noxious weed plants would be removed from areas disturbed by project related activities each year during the life of the project before they set seed. Invasive and noxious weed treatments would occur according to the 2004 Final Environmental Impact Statement for Integrated Treatment of

Noxious or Invasive Weeds, Coconino, Kaibab, and Prescott National Forests and Coconino, Mojave, and Yavapai Counties, Arizona.

Concurrent reclamation may also include establishment of berms to maintain internal drainage or seeding of native seeds to minimize erosion of soil piles. This may include ripping compacted areas, recontouring, placing growth media in disturbed areas, seeding of disturbed areas with indigenous, certified weed-free seed, and watering revegetated areas as needed to establish the seed. Specific revegetation requirements are included below in 2.5.6 *Revegetation*.

2.5.4 POST-MINING RECLAMATION

Post-mineral materials mining reclamation shall consist of removing all equipment and structures, recontouring disturbed areas, ripping compacted areas (including all temporary roads), seeding, and planting in some areas. Noxious weed management would continue to occur prior to, during, and after mining activities according to the 2004 Final Environmental Impact Statement for Integrated Treatment of Noxious or Invasive Weeds, Coconino, Kaibab, and Prescott National Forests and Coconino, Mojave, and Yavapai Counties, Arizona.

2.5.5 RE-CONTOURING

Re-contouring is often necessary after mineral materials mining activities to re-form steep slopes to a safe condition and ensure drainage that will reduce run-off to surrounding areas and facilitate re-growth of vegetation. At the conclusion of mineral materials mining activities, the site would be reshaped using overburden from mining activities to approximate the surrounding topography. For safety purposes, the working face would be sloped to no more than a 3:1 (horizontal: vertical) slope. The topography of the site would be shaped for internal drainage to minimize erosion to surrounding areas.

Recontouring of slopes within the pit boundaries would be designed to discourage unauthorized recreation use or unauthorized vehicle access. This would be accomplished both while (a) the pit is being actively used and (b) as part of the reclamation activities once usable material has been removed.

2.5.6 REVEGETATION

The goal of revegetation is to establish vegetation on the reclaimed site with similar density and diversity as the surrounding area or appropriate with the expected land use for the site. Successful revegetation would restore wildlife habitat, as well as prevent soil erosion in the gravel pits, and prevent the establishment of new populations, or spread of existing populations of any non-native weed species. In areas other than cinder pits or basalt outcrops, acceptable re-vegetation would consist of a minimum of 50 percent ground cover (live vegetation or vegetation litter) after at least three growing seasons.

Where feasible, stockpiled top-soil and large woody debris would be well distributed across the re-contoured areas. Reseeding shall occur with a U.S. Forest Service approved seed mix appropriate for the surrounding vegetation. Revegetation would be monitored for compliance (see 2.5.8 Monitoring and Remedial Reclamation

Activities below). Failure to meet the success standards may require additional planting and/or weed control, as appropriate.

Seed sources shall be certified weed free. Seed mix can include any of the following certified weed-free native species at a minimum of 5 pounds/acre of pure live seed. Certified weed-free seed mixes may be substituted in the reclamation plan for a specific plan of operations given it is deemed appropriate for the reclamation area. Potential vegetation for individual sites should utilize the Kaibab and Coconino National Forest Terrestrial Ecosystem Survey to identify species to be utilized:

1. Arizona fescue (*Festuca arizonica*)
2. Western wheatgrass (*Elymus smithii*)
3. Bottlebrush squirreltail (*Elymus elymoides*)
4. Purple geranium (*Geranium caespitosum*)
5. Western yarrow (*Achillea millefolium*)
6. Pussytoes (*Antennaria marginata*)
7. Arizona peavine (*Lathyrus arizonicus*)
8. Fringed sagebrush (*Artemisia frigida*)

The seed mix can contain a mixture of some of these suggested species but should not contain all these species and should include at least one grass species. The seed mix depends on the availability of these species. The site should be scarified prior to seeding. Where feasible, protect site with slash spread across the disturbed area to create microclimates and protect from grazing ungulates.

Temporary roads will be rehabilitated after use. This can be done through ripping the entire road bed, have slash placed on the trail or cross-ditched (waterbarred) to break the energy flow of water. Placing slash on temporary roads is the preferred method to dissipate the energy flow of water and disguise the road bed. Waterbars are only to be implemented with equipment with an articulating blade (no skidders) or by hand.

2.5.7 PUBLIC SAFETY

Public safety during mining operations would be ensured through access restrictions. Fences and gates may be installed to prevent access to mine sites where it is necessary to prevent potential safety hazards or where it is important to limit disturbance to facilitate re-growth of vegetation. The placement of gates or fencing would occur based on the site-specific conditions at each site. Any fences installed for safety or reclamation purposes would be removed after revegetation goals have been met. Any fences would be constructed to specifications in the Coconino National Forest Plan on page 69.

2.5.8 MONITORING AND REMEDIAL RECLAMATION ACTIVITIES

Reclamation monitoring would occur one year following the completion of initial reclamation activities and at approximately five years after the completion of reclamation activities. If it appears that reclamation efforts are not moving towards desired conditions, additional seeding, planting, or re-contouring may occur based on specific site needs. Eradication of noxious weeds may continue during mining activities or throughout reclamation to minimize the potential for the establishment and spread of weeds.

2.6 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED CONSIDERATION

The ID team considered potential alternatives to address issues raised by scoping comments. One alternative and the rationale for not carrying it forward for detailed analysis follows:

2.6.1 COMMERCIAL USE/DEVELOPMENT

The development of rock pits for commercial use was brought up by several members of the public during public scoping. Specifically, there were several requests that rock pits cleared through the NEPA process should be made available for commercial use through a mineral materials contract or other method.

The commercial development of one or more of the rock pits does not meet the purpose and need of the project to provide road surfacing to minimize water quality impacts from unpaved forest roads. In addition, commercial uses related to mineral materials is based on an approved operating plan, which specifies operating procedures and requirements to minimize impacts from mining activities. Since there are no proposed operating plans at this time on any of the proposed pit locations, this alternative is not ripe for analysis.

Commercial use for a pit (under a mineral materials contract) may occur based on the submittal and subsequent review of a plan of operations. Based on the information in the submitted plan of operations, additional NEPA may be required should the operations potentially include effects outside of the context and intensity of those considered in this EA (Forest Service Handbook 1909.15, Section 18.1).

2.6.2 OTHER PIT LOCATIONS

A total of approximately 99 pit locations were reviewed for rock pit development as part of this analysis. Initial analysis on these 99 pits showed that there were some pit locations located in known sensitive wildlife habitat, important viewshed areas, areas with known archeological sites, or areas with other resource concerns. Additionally, some prospective pit locations included poor material for road surfacing or were located so close to other prospective pit locations that they were not considered necessary. While 39 pit locations on the Coconino and Kaibab national forests were included in the proposed action, there were approximately 60 pit locations that were dismissed from detailed analysis due to various resource concerns that were identified from coarse scale analysis and input from public comments. More information on other rock pit locations considered and issues associated with these pit locations is included in the project record.

Chapter 3.

Affected Environment and Environmental Consequences

This chapter describes the affected environment and discloses the potential effects of the proposed action and each alternative. This section forms the scientific and analytical basis to compare the potential environmental effects of each alternative. The interdisciplinary team considered the following factors in their analysis of the potential environmental consequences:

1. The probable consequences of each alternative on environmental resources,
2. Achievement of project objectives,
3. Adherence to Forest Plan standards, guidelines and objectives,
4. Compliance with federal and state laws and regulations.

3.1 VEGETATION

3.1.1 EXISTING CONDITIONS FOR VEGETATION

3.1.1.1 General Characterization and Vegetation Cover Types

The Kaibab and Coconino National Forests range from 2,600 feet to 12,633 feet in elevation, providing for a diversity of plant communities. Open grasslands and sagebrush characterize the lower elevations, giving way to pinyon-juniper woodlands, and then transitioning into montane ponderosa pine forests and spruce-fir forests. The highest elevations of the San Francisco Peaks are covered by alpine tundra. Drainage ways and floodplains add riparian deciduous woodlands to the landscape.

Forested land covers 85 percent of the area across the two national forests (USDA 2010a, USDA 2010b). These forestlands include the lower elevation pinyon-juniper woodlands, ponderosa pine timberlands, higher elevation mixed conifer forests and deciduous riparian woodlands. Figure 7 displays the composition of the area across the Kaibab and Coconino National Forests by cover type.

Pinyon-juniper woodland, occurring between the elevations of 4,500 to 7,000 feet (Lowe and Brown 1973) is the most common cover type covering 42 percent of the area across the two National Forests. Individual tree species in this cover type include two-needle pinyon pine, Utah juniper, one seed juniper and, less commonly, alligator juniper. The ponderosa pine cover type occupies 35 percent of the area, primarily between 6,000 to

8,000 feet in elevation, but also occurring as low as 5,500 feet on north slopes and as high as 9,000 feet on south facing slopes. Ponderosa pine is the primary tree species on these sites, but other commonly found tree species may include gambel oak, Douglas fir, and white fir. Approximately 8 percent of the area is covered by a mix of higher elevation forest types and riparian woodlands. Tree species at the higher elevations may include Engelmann spruce, blue spruce, corkbark fir, white fir, Douglas fir, limber pine and aspen. The more common riparian tree species include cottonwood, willow, alder, and maple.

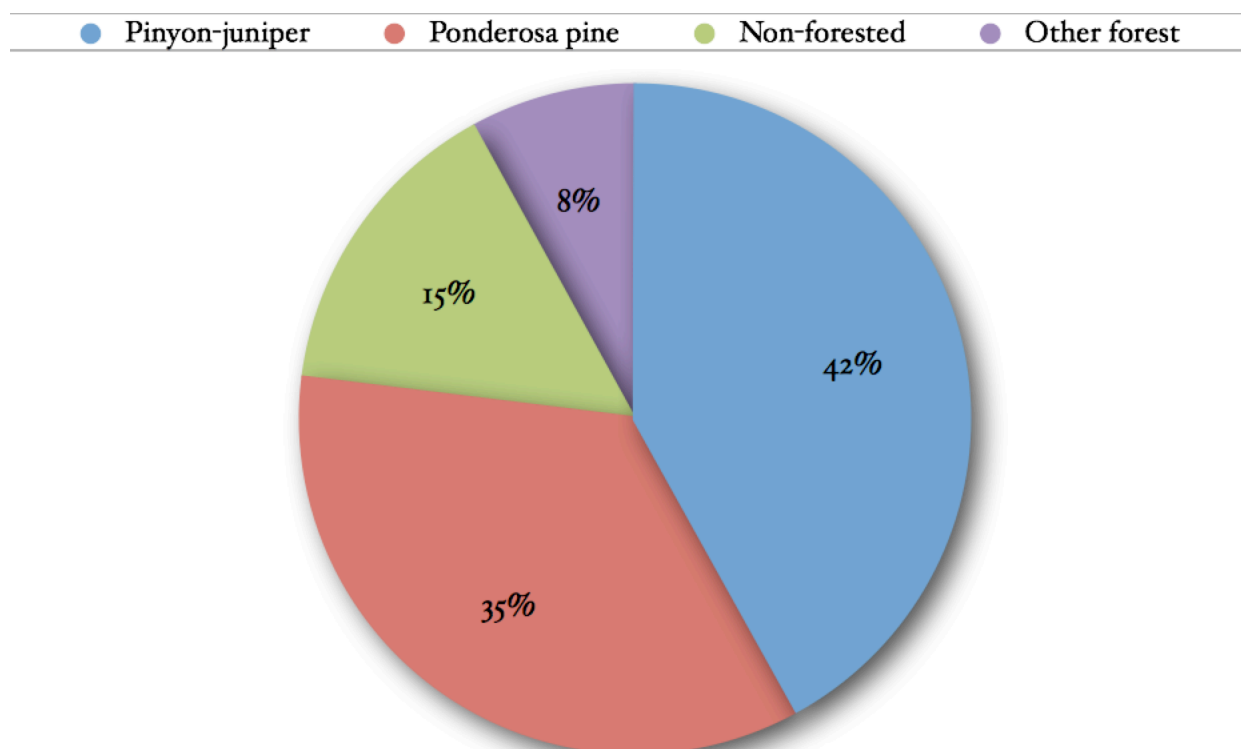


Figure 7. Percent of Total Area by Cover Type.

The 15 percent of area covered in non-forested vegetation types include low elevation grasslands and chaparral as well as high elevation grasslands and alpine tundra. The low elevation grasslands are semidesert and include species such as mutton bluegrass, Junegrass, western wheatgrass, spike and ring muhly, and blue grama (USDA 2005). Chaparral is shrub dominated plant communities that grade into the pinyon-juniper type. Common shrubs found in these areas include: manzanita, silktassel, mountain mahogany, cliffrose and evergreen oaks. High elevation grasslands are found on the higher plateaus of both forests. Some of the more common plants found in these grasslands are Arizona fescue, Kentucky bluegrass, mountain muhly, western wheatgrass, yarrow, Rocky Mountain iris, cinquefoil, blue grama, globemallow and rabbitbrush.

Table 5. Potential Natural Vegetation Types of the Pit Expansion Areas.

Pit name	Ponderosa pine (acres)	Pinyon-juniper types (acres)	Montane subalpine grassland (acres)
Big Draw	2.8		
Big Ridge	2.0		
Buck Butte	8.7		
Bushy Knoll	13.8		
Cinch Hook	10.7		
Crazy Cow	14.9		
Davenport	6.9		
Deadhorse	7.6		
Dillman		2.4	
Dog Knobs		0.9	
Double A		1.9	
Fitzgerald		5.8	
Fues		4.2	
Hostetter 2	19.2	3.7	
Jackass Knoll	1.6		
Kaibab Site 1-A	13.5		
Kaibab Site 2-C	8.6		
Kaibab Site 4-A		7.6	
Lockwood	5.0		
Macks	4.6		
Marteen	7.1		
Oak Grove		5.2	
Pine Hill Cinders	1.7		
Pittman Valley			1.5
Ruin	4.9		
Salmon Lake	10.3	0.5	
Smoot Lake		11.1	
Snafu	10.7		
Thomas 2	4.8		
Turkey Knob	7.7		
W Triangle	4.3		
Willard Springs	1.9		
Youngs Canyon		11	
Total Area	173.3	54.3	1.5

Table 5 displays the potential natural vegetation types (PNVTs) in the pit expansion areas and areas where new pits would be developed. PNVTs represent the potential plant community that could occupy the site under historic fire regimes (USDA Forest Service 2008). As shown in the table, 75 percent of the new pits and pit expansion areas are in the Ponderosa pine PNVT, 24 percent are in the pinyon-juniper PNVT, and less than one percent are in the montane subalpine grassland PNVT.

3.1.1.2 Noxious and Invasive Plant Species

Noxious weeds and invasive plants include unwanted plants that grow and spread aggressively. They are often alien species that replace desirable native vegetation. Invasive species have increased across the two forests over the last twenty years (USDA Forest Service 2005). Some of the more widely spread invasive plant species found on the forests are include leafy spurge, yellow starthistle, Russian knapweed, diffuse knapweed, and spotted knapweed. These species tend to form monocultures and eliminate all other native plants within areas they populate. These plants can also produce toxic substances that harm humans, livestock and wildlife (USDA Forest Service 2005).

Table 6. Proposed Rock Pits near Known Invasive Plant Populations.

Pit name	Description of Known Invasive Plant Species Population
Pit 222	Bull thistle and Dalmatian toadflax are found within the existing pit area. Dalmatian toadflax is also present near the access road.
Lockwood	Bull thistle is found within the existing pit area and along the access road. Camelthorn is found along Hwy. 87, several miles from the pit.
Riordan	Bull thistle is found within the existing rock pit. Diffuse knapweed and scotch thistle are found along nearby Interstate Highway 40. Dalmatian toadflax is also found along roads in the area.
Willard Springs	Diffuse knapweed is present within the existing pit area, along the access road and the near by I-17 corridor.
Youngs Canyon	Scotch thistle and Dalmatian toadflax are found near the access road that would be used for this new pit.

Five of the rock pits and expansion areas are near known populations of invasive plants (Table 6), including bull thistle, Dalmatian toadflax, camelthorn, diffuse knapweed and scotch thistle. These species are among 24 noxious weeds that were ranked according to their treatment priority by the Coconino, Kaibab and Prescott National Forests from 1 (top priority) to 24 (lowest priority). Very aggressive plant species, with small isolated populations that are to be eradicated, have the highest priority for treatment. The invasive species found near the existing pits or expansion areas are described in The Final Environmental Impact Statement for Integrated Treatment of Noxious or Invasive Weeds (USDA Forest Service 2005) as follows:

Bull thistle (*Cirsium vulgare*): Treatment Priority 20: A stout biennial thistle with purple flowers that originated in Eurasia. It invades disturbed sites including slash piles, old log decks, and roadsides. Regeneration is solely from short-lived seed. It grows in numerous areas of the Coconino National Forest and eastern part of the South Zone of the Kaibab National Forest. There are isolated populations on the North Kaibab Ranger District in the Jacob Lake area.

Dalmatian toadflax (*Linaria dalmatica*) - Treatment Priority 18: An introduced ornamental from the Dalmatian region of Eastern Europe. It is a perennial weed that can grow up to 3 feet tall, and reproduces from both seed and underground rootstalks. One plant can produce up to one-half million seeds, as well as lateral roots up to 10 feet from the plant. It forms dense stands eliminating native species by out-competing them for water. Often stands of Dalmatian toadflax will disappear for several years, only to re-establish through the seed bank or possibly vegetative root buds. It is widely dispersed throughout the ponderosa pine type and is spreading along roadsides into pinyon-juniper and lower elevation ecosystems.

Camelthorn (*Albarghi pseudoalbagi*) - Treatment Priority 4: A perennial from the Mediterranean area and Asia. It is a spiny shrub that reproduces from seeds and by underground rhizomes. It grows in disturbed soil where it forms monocultures if not controlled. Seeds may be viable for years, although reproduction is mostly vegetative. It can grow through pavement, and the thorns can flatten car tires. Camelthorn is present along roads in and around Flagstaff.

Diffuse knapweed (*Centaurea diffusa*) - Treatment Priority 9: An annual or short-lived perennial from the Mediterranean region. Knapweed is a member of the sunflower family, growing from one to two feet tall, with a single strong taproot. It reproduces by seed, and seeds can remain viable for as long as 12 years. Dead plants break off at ground level and tumble around, spreading seed in the wind. It produces chemical compounds that inhibit other species (even other knapweeds) from growing around it. Infestations are found throughout the Flagstaff area.

Scotch thistle (*Onopordium acanthium*) - Treatment Priority 11: A large biennial thistle, native to Europe. Characteristics include broad, spiny stems with vertical ribs, large, spiny leaves with dense hairs and violet to reddish flowers. The plants can create an impenetrable thicket. Seeds are viable for 6 years. This species grows in disturbed habitats along roadsides and in waste areas. There are many populations of this thistle along the interstate and State highway systems and a few infestations occur on the North Kaibab Ranger District on the Kaibab National Forest.

3.1.1.3 Rare Plants

Rare plants include species that have been listed as threatened or endangered under the Endangered Species Act of 1973 (ESA) as well as those plant species that have been placed on the US Forest Service Region 3 Regional Forester's Sensitive Plants List. No plant species on the US Fish and Wildlife Service's list of endangered and threatened species are known to occur on the Kaibab National Forest. Two plant species that are protected under the ESA do occur on the Coconino National Forest including the San Francisco Peaks ragwort (*Packera franciscana* listed as San Francisco Peaks groundsel *Senecio franciscana*) and the Arizona cliffrose (*Purshia subintegra* formally *Cowiania subintegra*).

San Francisco Peaks ragwort was listed as a threatened species in 1983. This species is a dwarf alpine plant that is only found above 10,900 feet on talus slopes of the San Francisco Peaks, north of Flagstaff Arizona (U.S. Fish and Wildlife Service 2010). None of this habitat occurs in a proposed rock pit location.

Arizona Cliffrose, a spreading evergreen shrub and member of the rose family, was listed as endangered in 1984. It is found on the north edge of the Sonoran Desert and only occurs on limestone formed from Tertiary lakebed deposits. It occurs in four disjunct populations in central Arizona. A part of the Cottonwood population is found on the Coconino National Forest. None of the proposed rock pits are located in Arizona Cliffrose habitat.

There are 35 plant sensitive plant species found on the Kaibab and Coconino National Forests. These are plant and animal species for which there is a population viability concern. A list of these 35 species can be found in the Rock Pits Environmental Assessment Specialist Report for Vegetation (JW Associates 2013a). The complete list for Sensitive Species for the region can be found in the Regional Forester's List of Sensitive Plants at: http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fsbdev3_021246.pdf.

A review of the pit locations and mapped populations of sensitive plant species indicates that only one sensitive species, Rusby's milkvetch (*Astragalus rusbyi*), may be potentially affected by the proposed actions. Plants of this species are located along the access road to the 222 pit.

Rusby's milkvetch is an herbaceous perennial whose preferred habitat includes openings or meadows in ponderosa pine forests. It prefers dry basaltic soils and is typically found between 7,000 and 8,000 feet in elevation, although it occurs as low as 5,400 feet in the Oak Creek Canyon and may occupy areas as high as 9,000 feet in elevation. This species has a very limited range which includes the lower slopes of the San Francisco Peaks and Oak Creek Canyon. It is listed as sensitive due to its rarity and restricted range.

3.1.2 THE EFFECTS OF ALTERNATIVES ON VEGETATION

3.1.2.1 Effects Common to All Alternatives

None of the alternatives would have any effect on San Francisco Peaks ragwort or Arizona cliffrose, the two rare plants listed under the ESA that occur on the Coconino National Forest. Alternative A - No Action does not propose expansion or development of any pits. Existing rock sources would be used for temporary road construction and maintenance of existing roads. Existing rock sources are not a threat to either the Arizona cliffrose or the San Francisco Peaks ragwort (U.S Fish & Wildlife Service 1987 and 1995).

Likewise, neither of the action alternatives would have any effect on San Francisco Peaks ragwort or Arizona cliffrose because the proposed pits do not occur in any habitat for these species. None of the new pits or pits proposed for expansion by Alternative B - Proposed Action and Alternative C are located within the alpine habitat where the San Francisco Peaks ragwort is found, or near the limestone deposits where the endangered Arizona cliffrose is found. There are no proposed rock pits near the Verde Valley where the Cottonwood population of Arizona cliffrose is located. Since none of the proposed activities are near any of the listed plant populations, or near their preferred habitat, there would be no effect on these plant species.

3.1.2.2 Alternative A - No Action

Direct and Indirect Effects

Alternative A - No Action would have no direct effect on the vegetation cover types in the Project Area. Alternative A - No Action does not propose the development of new pits or expansion of existing ones. Therefore, no vegetation would be removed in the pit areas.

Alternative A - No Action does not propose revegetation of existing pit areas. Overtime, this alternative would have less area of natural vegetation when compared to the action alternatives.

An indirect effect of this alternative is a slightly lower risk of the spread of invasive species in the Project Area as compared to the action Alternatives. Alternative A - No Action exposes less soil and disturbs less area which lessens the amount of area suitable for the establishment or spread of invasive plants. The treatment of noxious and invasive species would continue as prescribed by the three forest integrated treatment plan.

Cumulative Effects

Alternative A - No Action would have no direct effect on the vegetation cover types in the Project Area and therefore would not contribute to the cumulative effects on vegetation across the Kaibab and Coconino National Forests.

3.1.2.3 Alternative B - Proposed Action

Direct and Indirect Effects

General Vegetation

Alternative B - Proposed Action proposes to expand 20 existing rock pits and develop 13 new pits. These actions would require removal of up to 229 acres of existing natural vegetation, primarily within ponderosa pine and pinyon-juniper plant communities. Vegetation removal would be dispersed across the two forests and 33 pit sites and would occur at different times over the next twenty years. The largest area of vegetation removal would be at the new Thomas 2 pit where up to 19.3 acres of ponderosa pine would be removed. The smallest removal would be at the Dog Knobs pit site where expansion would require the removal of less than an acre of existing vegetation. The average area of vegetation removal per existing or proposed pit would be 7 acres. Six existing rock pits would be used without expansion or additional vegetation removal.

The Proposed Action includes plans for reclamation of the pit sites following material extraction. Reclamation includes re-contouring the pits, distributing stockpiled soil and materials and planting native, weed-free seeds and vegetation. A goal of reclamation is to establish indigenous vegetation in reclaimed areas. The reclamation is proposed for new pits, expansion areas and some existing pit areas. A total of 435 acres could be restored over the next 20 years. Reclamation would increase the area vegetated with native vegetation by 203.6 acres over current conditions. Overtime, this alternative would increase the area of native vegetation.

Noxious and Invasive Plants

Invasive plants often become established on disturbed sites and along travel corridors. The development and expansion of the rock pits would disturb soils and create site conditions conducive to the establishment and spread of invasive weed species. These effects would be minimized by specific design features. Best management practices (BMPs) that reduce the potential for the spread of weeds would be employed during the development, operation, and reclamation of the rock pit sites. These practices would include the following:

1. Equipment would be inspected and cleaned before entering rock pit areas to prevent the introduction of invasive weeds.
2. Soil disturbance would be avoided to the extent practicable.
3. Noxious or invasive weed populations would be monitored and treated if infestations expand or if new noxious or invasive weeds are detected in the project area.

A complete list of BMPs is found in Appendix B of the “Final Environmental Impact Statement for Integrated Treatment of Noxious or Invasive Weeds” (US Forest Service 2005).

Rare Plants

No threatened or endangered plants would be affected by this alternative.

Rusby’s milkvetch (*Astragalus rusbyi*) is the only Forest Sensitive species that could potentially be affected by the activities proposed by the action alternatives. Rusby’s milkvetch can be found along the access road to the 222 pit. Alternative B - Proposed Action does not expand the 222 pit or build additional road to access this pit. The pit would continue to be accessed via the main route, Forest Road 222, which is a regularly used route by Forest visitors. The existing pit impacts just under 13 acres of land. It is estimated that in years that the pit is active, there would be blasting and crushing activities over a 6 to 8 week period and hauling for about two weeks with roughly 4 trucks per hour using the road that accesses the pit.

It is possible that the mining and transport of materials from the 222 pit may impact some of the Rusby’s milkvetch plants located adjacent to the access road and pit area. The increased traffic and movement of large equipment along the road, as well as the blasting and crushing of rock in the pit area, could increase the deposition of dust onto these plants, possibly reducing plant vigor. These effects would be most pronounced if heavy road use or processing occurs during the growing season. There would also be an increased chance that individual plants could be crushed by large debris knocked off the road bed or by vehicles that stray from the road or pit area.

These effects to the Rusby’s milkvetch would likely be indirect and temporary in nature. Any plants that are covered with dust would be expected to recover once the dust has been rinsed off from rain or once the plant has gone through dormancy and regrowth has occurred. Dust abatement measures are included in the design features for this alternative and would help to minimize the potential effects of dust on roadside vegetation. The loss of individual plants would not have a significant impact on the overall population in the area. Trucks

hauling material from the pit would be required to cover their load. This would reduce the potential for larger material from the trucks falling onto the roadside vegetation.

The proposed action requires that the pits be reclaimed once they are no longer in use. Reclamation would include re-contouring and the establishment of native vegetation. Given the proximity of some of the Rusby's milkvetch plants to the 222 pit, there would be the potential for some plants to be crushed during the reclamation processes. It is recommended that a botanist work closely with engineers and equipment operators during reclamation to insure protection of this species. Overtime, this alternative may have a beneficial effect on Rusby's milkvetch by re-establishing native vegetation on the existing pit site and potentially providing additional habitat for the local population of milkvetch.

Cumulative Effects

General Vegetation

The area considered for cumulative effects to vegetation includes the Coconino and Kaibab national forest boundaries including adjacent private, state and county/municipal lands. Cumulative effects of projects currently being implemented or likely to be implemented over the next 20 years are considered here. Given the comparatively small area that would be impacted by the proposed activities (0.007% of the Coconino and Kaibab national forests land base), this alternative would have only a minor cumulative effect on the vegetation across the Kaibab and Coconino National Forests. Appendix A provides a table of the future foreseeable actions for the two National Forests. Many of the future actions are large in scale, altering thousands of acres of vegetation across the two forests. For example, there are approximately 100,000 acres of ponderosa pine acres on the Coconino National Forest that have been approved for Forest restoration treatments in the past 5 years. In addition, proposed projects such as the 4 Forest Restoration Initiative, Turkey-Barney Forest Restoration, Mahan-Landmark Forest Restoration, the Flagstaff Watershed Protection Project, Bill Williams Mountain Restoration Project, and the Watts Vegetation Management Project would result in an additional 400,000 acres in vegetation management that could result in a cumulative effect to vegetation.

The large majority of cumulative effects would result from the 173 acres of impacted ponderosa pine vegetation from this alternative, 54 acres of impacted pinyon-juniper vegetation, and 1.5 acres of impacted montane grassland vegetation which may result in a cumulative impact of loss of vegetation in the project area and adjacent areas. However, the forest restoration projects would only have a temporal effect on vegetation and would likely have a long-term effect of improving tree survival and stand resiliency to wildfire and disease. More appropriate cumulative effects are those that result in a long-term loss of vegetation, which includes other pits, private land development, and vegetation clearance for utility projects.

Thus, projects including the DC Hub Wireless Communications Site Development, APS NO1 Youngs to Mormon Lake 69kV Power Line project, APS VR1 Windmill Ranch 69kV Line, APS Cornville Power Line Rebuild, Camp Verde Park and Sanitary district Roads widening project, Cornville community trails and proposed hiking trails, Oak Creek water company pipeline project, and Sedona Trails – Phase III project would have more similar impacts of vegetation removal which could result in a cumulative effect. The

mentioned projects result in very localized removal of vegetation and while they will result in a cumulative loss of vegetation on the Forest, they will not likely result in a cumulative impact to vegetation health or fragmentation since they are all generally isolated activities and an extremely small percentage of each vegetation type. This action would have a small cumulative effect by adding isolated patches vegetation openings to the landscape. When compared to the potential effects of the future foreseeable actions this alternative would contribute very little to the cumulative effects on the vegetation across the two national forests.

Rare Plants

This alternative could impact individual Rusby's milkvetch plants by removing potential habitat for this species, and therefore, this analysis looks at other potential impacts to the population over the next twenty years to analyze potential cumulative impacts on the species. Other activities in the Project Area that could add to cumulative impacts to Rusby's milkvetch include grazing, the Wing Mountain Fuels Reduction and Forest Restoration Project, risk of high-intensity wildfire, recreation use along the Schultz Trail, and group camping along and adjacent to the 222 road and surrounding area.

Cows generally avoid vetch plants, however, it is possible that individual plants could be damaged or destroyed from trampling by livestock. However, the potential for damage from livestock is small due to grazing practices. Livestock are spread out throughout the allotment and rotated through each pasture after a period of approximately 30 days. Thus, even if individual plants are stepped on by cattle they are likely to recover throughout the rest of the growing season.

Forest restoration projects including thinning and prescribed fire treatments implemented under the Wing Mountain Fuels Reduction and Forest Restoration Project is expected to maintain or increase the population within 1-5 years after treatment. In a long-term ponderosa pine ecological restoration study in the Fort Valley Experimental Forest, Rusby's milkvetch was an indicator species of tree thinning and prescribed burning, showing a positive response to treatments (Laughlin et al. 2008). Other studies have indicated that this relationship doesn't always occur. However, there are no studies that indicate restoration treatments result in a long-term decline in Rusby's Milkvetch.

High-intensity wildfire could occur in many of the areas currently occupied by milkvetch. Although restoration treatments would decrease this risk, it is possible that a high-intensity wildfire could affect a majority of the area occupied by this species, resulting in a substantial decline of this population in the short-term.

Recreation use such as hiking in locations with known milkvetch sightings (such as the Schultz Creek trail) and dispersed camping in the Wing Mountain area and along the foothills of the San Francisco Peaks may impact some individual plants. However, these activities are more likely to limit the potential habitat that can be re-colonized rather than impact existing plants because the hiking trail and most attractive camping areas in these locations have already been impacted.

Overall, the proposed action could combine with activities such as wildfire, grazing, and recreational use to impact individuals Rusby's milkvetch. However, unless there is a large high-intensity wildfire in the south and

west foothills of the San Francisco Peaks, these impacts are limited and unlikely to result in a cumulatively significant impact to the population located in and adjacent to the Coconino National Forest and thus would not result in cumulative effects that would contribute to a trend toward listing under the Endangered and Threatened Species Act.

3.1.2.4 Alternative C

Direct and Indirect Effects

General Vegetation

The direct and indirect effects of Alternative C, the modified proposed action, would be similar to those discussed for Alternative B - Proposed Action. The differences in Alternative C from Alternative B - Proposed Action include no development of the Youngs Canyon pit site and rehabilitation of seven abandoned pit sites. Other than these modifications, the proposed actions under Alternative C are the same as those for Alternative B - Proposed Action.

Alternative C would remove 216.2 acres of vegetation for expansion of 20 existing rock pits and development of 12 new pits, primarily within ponderosa pine and pinyon-juniper plant communities. Vegetation removal would be dispersed across the two forests and 32 pit sites and would occur at different times over the next twenty years. Like Alternative B - Proposed Action, six existing rock pits would be used without expansion or additional vegetation removal.

Each rock pit would be rehabilitated following development and material extraction. Additionally, Alternative C would reclaim seven abandoned pits that would not be developed. Reclamation includes re-contouring the pits, distributing stockpiled soil and materials, and planting native, weed-free seeds and vegetation. One goal of reclamation would be to provide for the establishment of indigenous vegetation. Alternative C would restore 515.9 acres over the next 20 years, increasing the vegetated area by 309.6 acres over current conditions. Over time, this alternative would increase the area of native vegetation in the Project Area.

Noxious and Invasive Plants

Alternative C would disturb fewer acres than Alternative B - Proposed Action because the Youngs Canyon pit (11 acres) would not be developed. The development and expansion of the rock pits would disturb soils and create site conditions conducive to the establishment and spread of invasive weed species. These effects would be minimized by specific design features and Best management practices (BMPs) that reduce the potential for the spread of weeds would be employed during the development, operation, and reclamation of the rock pit sites. These practices would be the same as discussed for Alternative B - Proposed Action.

Seven abandoned pit sites (114.6 acres) would be rehabilitated under this alternative. Closing these abandoned pit sites and establishing native vegetation would further reduce the potential for the spread of noxious and invasive plants in these areas.

Rare Plants

Alternative C, the modified proposed action, would have the same effects on sensitive plant species as those discussed for Alternative B - Proposed Action.

Cumulative Effects

The cumulative effects of Alternative C would be the same as discussed for Alternative B - Proposed Action.

3.2 ROADS/AIR QUALITY _____

3.2.1 EXISTING CONDITIONS FOR ROADS AND AIR QUALITY

3.2.1.1 Roads

There are more than 10,000 miles of National Forest System roads on the Coconino and Kaibab National Forests (Table 7). Both the Coconino and Kaibab National Forests have completed travel management decisions that have designated a system of roads, trails and areas of public use. Only a small portion of the total road mileage in Table 7 is used by Forest visitors. In addition to the Coconino and Kaibab National Forest System roads, each Forest includes several hundred miles of unauthorized roads. These roads are not managed or maintained by the Forest Service, but often tracked using geographic information systems (GIS). These unauthorized roads will not be maintained or surfaced unless they are identified and approved as a temporary road for forest thinning or other projects, which would require separate analysis and public disclosure under the National Environmental Policy Act. Temporary roads are obliterated after project implementation is complete.

Traffic on most NFS roads, especially those roads connecting to the proposed rock pits, is generally low volume. For example, traffic counters on selected main forest roads shows an average daily use of 52 to almost 400 vehicles a day. Since the temporary roads being considered in this project are not through roads and provide access to nothing other than the proposed rock pits, it is likely that traffic on these temporary roads will be based solely on the operation of the pit for which they are being proposed.

High use recreation periods, such as holiday weekends, generate moderate traffic in the areas of attractive recreational resources, such as campgrounds and water features. For example, roads with the greatest amount of traffic were found to be those that are accessible by a major state or county highway, provide through access, and provide access to areas with several recreation opportunities. Because of the low traffic volumes these roads are generally quite safe for recreational driving and other forms of travel. Due to the large percentage of high-clearance vehicle roads (Table 7), vehicle speeds are relatively low. Existing forest management projects that require the use of heavy trucks utilize signs and closures, if needed, to maintain safe operations for the public. Due to the large number of roads on these two forests, there are usually several alternative routes for the public when there is a temporary closure as a result of forest service or permitted activities.

Table 7. Existing Roads on the Coconino and Kaibab National Forests¹.

Forest	NFS Road Type	Approximate Miles of Roads
Coconino National Forest	Passenger car use	727
Coconino National Forest	High-clearance vehicle	4,427
Coconino National Forest	Total	5,154
Kaibab NF, Williams RD	Passenger car use	120
Kaibab NF, Williams RD	High-clearance vehicle	1,350
Kaibab NF, Tusayan RD	Passenger car use	105
Kaibab NF, Tusayan RD	High-clearance vehicle	604
Kaibab NF, North Kaibab RD	Passenger car use	185
Kaibab NF, North Kaibab RD	High-clearance vehicle	3,156
Kaibab National Forest	Total	5,520
Both Forests	Total	10,674

3.2.1.2 Air Quality

The air quality of the project area is generally very good. The project area is not within any air quality Non-Attainment Areas designated by the Arizona Department of Environmental Quality (DEQ). The closest nonattainment area is the Payson area, which is not in full attainment for PM₁₀ because of emissions from industrial sources (rock crushers, concrete batch plants, and a sawmill), wood smoke, and paved and unpaved roads (US Environmental Protection Agency 2010). These industrial areas are generally very large in size and operating throughout most of the year. The proposed rock crushing to occur for rock pits in this project would likely be an order of magnitude smaller than the industrial rock crushing sites and would only operate for short periods of time to produce materials needed for road surfacing.

The cities of Flagstaff, Camp Verde, Sedona and Cottonwood, Yavapai and Coconino Counties, and other areas surrounding the Coconino National Forest are in full compliance, or attainment status and, therefore, do not have regulations concerning fugitive dust.

Pollution and haze from urban/industrial centers does drift over the project area under certain conditions. Visibility, especially in the adjoining Grand Canyon National Park, is affected by this haze. Smoke from wildfires, prescribed fires, and wood stoves also contributes particulates and haze to the project area periodically. The majority of roads in the project area are unpaved. These gravel and dirt roads are sources of

¹ Source: Forest Travel Management Planning documents. This includes all system roads under National Forest System jurisdiction. This table does not include information on road designations for public motor vehicle use.

fugitive dust in dry weather, especially when there is frequent vehicle traffic and when there are wildfires in the area that contribute to regional haze.

The Regional Haze Rule (40 CFR 51.309(d)(7)) requires states to assess and reduce pollutants that cause haze in order to improve visibility at Class I Airsheds, including Grand Canyon National Park and Sycamore Canyon Wilderness. The Regional Haze State Implementation Plan for the State of Arizona from December 23, 2003 states that “road dust is not a measurable contributor on a regional level to visibility impairment in the 16 Class I areas. Due to this finding, no additional road dust control strategies are needed...” The Plan also states that the State of Arizona will “perform further assessments of road dust impacts on visibility. Based on these assessments, if road dust emissions are determined to be a significant contributor to visibility impairment, the State of Arizona commits to implement emissions management strategies...”

In addition to the Sycamore Canyon Wilderness Class I Airshed, the Coconino National Forest plan directs that all Wilderness areas should be treated as Class I Airsheds (Coconino National Forest Plan, p. 111). This means that air quality should be maintained in other Wilderness areas on the Coconino National Forest including the Kachina Peaks Wilderness, Red Rock Secret Mountain Wilderness, Munds Mountain Wilderness, Wet Beaver Wilderness, West Clear Creek Wilderness, and Fossil Springs Wilderness. Since road dust is currently not considered to be a measurable contributor on a regional level to visibility impairment in all of the other Class I areas, it is expected that it would not result in measurable impacts to these other Wilderness areas on the Coconino National Forest.

3.2.2 THE EFFECTS OF ALTERNATIVES ON ROADS AND AIR QUALITY

3.2.2.1 Alternative A - No Action

Direct and Indirect Effects

Roads, Traffic and Safety

Alternative A - No Action would not change the miles of road on either the Kaibab or Coconino National Forests. However, traffic on existing roads would be the greatest for this alternative due to the longer haul distances from existing forest and commercial rock sources. Assuming that all alternatives haul the same amount of material, the miles driven to haul that material would be 117,779 miles for Alternative A - No Action compared to 39,260 miles for Alternatives B and C. Longer haul distances would increase the costs of applying rock to road surfaces that need maintenance. Due to constrained budgets and increasing haul costs, the net result is fewer miles of road being maintained, which would reduce forest road safety to some degree, compared to Alternatives B and C.

Air Quality

Fugitive dust would be generated from traffic and would be greater on unsurfaced roads. Unsurfaced roads have finer particle sizes and therefore generate more fugitive dust with the same amount of traffic (Swift 1984). Alternative A - No Action would have longer haul distances for trucks hauling from existing and other

commercial rock pits. This increased traffic combined with a greater amount of unsurfaced roads means Alternative A - No Action would generate more fugitive dust, compared to Alternatives B and C. Air quality would be degraded locally (approx. 50 meters from the road, Padgett 2006) during use of NFS roads as haul routes, but this impact would likely not manifest at the regional level to affect Class I Airsheds. Effects would be noticeable for short periods where hauling of road surfacing materials increases fugitive dust on haul routes used to haul in materials from nearby aggregate material plants. This effect would be greater in areas with open vegetation where there is a lack of trees and brush to reduce the spread of fugitive dust. Communities and counties in the project area do not regulate fugitive dust because these areas are all in attainment for air quality standards relating to particulate matter and because it is not an air quality problem based on the Regional Haze State Implementation Plan. It is possible that the additional hauling of materials needed for road surfacing on the southern portion of the Coconino National Forest could contribute to dust that contributes particulate matter in non-attainment areas such as the Payson Area over the next 20 years.

Cumulative Effects

Roads, Traffic and Safety

Appendix A includes all present and reasonably foreseeable projects within the project area that would have potential cumulative effects on roads, traffic and safety. Direct and indirect effects of Alternative A - No Action combined with the effects of all present and reasonably foreseeable projects within the project area, would result in some short-term increases in traffic. However, those increases would be minor when compared to the existing traffic and would be dispersed through the two national forests. The miles driven for Alternative A - No Action would be about three times the miles required by the other alternatives, therefore, it is more likely to combine with other projects to cause traffic bottlenecks for short periods of time in high-use areas on the two national forests. The Mogollon Rim is a good example of where there are dozens of gravel roads that are heavily used for recreation. Motor vehicle use (by the public) could be restricted to these roads as a result of travel management. Roads such as 87, 260, 300, 211, 95, 147 could experience a higher likelihood of short-term traffic increases as a result of the hauling. This alternative would also cumulatively combine with increased hauling likely to result from treatments under the Four Forest Restoration Initiative and similar restoration and fuels reduction projects, which may substantially increase hauling by heavy machinery on portions of the Coconino and Kaibab national forests over the next 20 years. This would likely result in a cumulative impact on traffic on main Forest System and State roads including 87, 260, 300, 211, 95, 147 and several others on the Coconino and Kaibab National Forests. Alternative A - No Action is expected to increase traffic and traffic delays, but is not expected to generate cumulative effects to safety because of the normal precautions that are used hauling materials on NFS roads, such as signage and speed restrictions.

Air Quality

Appendix A includes all present and reasonably foreseeable projects within the project area that would have potential cumulative effects on air quality. Direct and indirect effects of Alternative A - No Action combined with the effects of all present and reasonably foreseeable projects within the project area, would result in some increases in fugitive dust. However, those increases would be minor, short-term and would be dispersed

throughout the two national forests. Fugitive dust is not regulated in the project area based on the Regional Haze State Implementation Plan. Alternative A - No Action could cumulatively increase fugitive dust along roads that are not well surfaced and that receive high recreation use. This cumulative effect would primarily occur on the weekdays and would likely be limited as a result of project-specific BMPs to minimize dust. Additionally, the management of prescribed fires and wildfires for resource benefit could produce smoke and that could combine with the dust from regular weekday and weekend traffic to cumulatively decrease air quality where these activities are co-occurring for periods from several hours to several days. In general, smoke from wildfires could be of such great impact that particulate matter from road dust would be less than noticeable rather than cumulative for regional airsheds, Class I Airsheds, and other Wilderness areas on the Coconino National Forest.

3.2.2.2 Alternative B - Proposed Action

Direct and Indirect Effects

Roads, Traffic and Safety

Direct effects of Alternative B - Proposed Action include construction of approximately 0.48 miles of temporary roads and improvement of 3.25 miles of existing roads. In the context of the more than 10,000 miles of existing roads (Table 7) these effects would be extremely small, especially since these roads would be obliterated at the end of rock pit use.

Table 8 provides the estimated miles of road that would be potentially resurfaced during the 20 years of this project if Alternative B - Proposed Action is implemented. Approximately 32.3 miles of road would be resurfaced annually using an estimated 29,445 cubic yards of material from the pits. For this analysis it was assumed that the majority of Level 3 roads and 10 percent of the Level 2 roads within a 5-mile radius of selected pits would be resurfaced.

The expected schedule for yearly use of the pits would be 3-8 weeks of work removing material from the pits, blasting, processing by means of a crusher and stockpiling the material. Hauling would be accomplished in about 2 weeks with 8-10 trucks completing several round trips each day. There would be about 4 trucks per hour entering and leaving the site during the hauling period. Hauling would likely overlap somewhat with the extraction and processing of aggregate materials. On average, there would be two use periods of 3 weeks per year.

The number of miles driven to haul the material would be 39,260 miles, approximately one-third of the 117,779 miles required to haul the material for Alternative A - No Action. The miles driven and schedule would decrease traffic on area roads from trucks hauling the surfacing material compared to Alternative A - No Action. Thus, the proposed action would decrease the amount of hauling on non-surfaced roads needed for road maintenance and would thus result in less overall road use and traffic.

Any impacts from the truck traffic would be mitigated somewhat due to the hauling and traffic restrictions as outlined in the design criteria for Alternative B – Proposed Action, below. These criteria would also be instrumental in maintaining public safety:

1. For public safety, camping would be prohibited within active rock pit areas.
2. For public safety, signs would be placed at major intersections on hauling routes during periods of active hauling.
3. Prior to blasting activities, landowners within a minimum of 2 miles of the blasting location would be notified.
4. Crushing and blasting activities would be avoided to the extent practicable on summer weekends, and the following holidays: Memorial Day, Fourth of July, and Labor Day. Hauling and road surfacing activities would only occur during those times to support critical project timelines and would be located away from heavily used recreation sites. Hauling and road surfacing on summer weekends, and the following holidays: Memorial Day, Fourth of July, and Labor Day would be rare events.
5. Where needed, entrances to active rock pit sites would be gated to prevent inappropriate OHV use, dumping, or other activities.
6. Trucks hauling materials would follow all current rules regarding speed limits including no more than 25 miles per hour on all forest roads, and 10 miles per hour within 0.25 miles of all signed campgrounds and trailheads.

Air Quality

Fugitive dust would be generated from traffic as well as from the crushing and sorting that would occur at the rock pits. Dust generated from traffic would be greater on unsurfaced roads. Unsurfaced roads have finer particle sizes and therefore generate more fugitive dust with the same amount of traffic. Alternative B - Proposed Action would have shorter haul distances for trucks than Alternative A - No Action. Therefore, Alternative B - Proposed Action would generate less fugitive dust, compared to Alternative A - No Action, and about the same as Alternative C. Air quality would be degraded locally during use of National Forest System roads as haul routes, but those effects would be minimized through the use of design criteria (see below). Impacts from fugitive dust would occur within approximately 50 meters of unsurfaced roads (Padgett 2006), with the duration of airborne dust depending on the amount of traffic. Since the project area includes pits located in generally open ponderosa pine and juniper vegetation, it is expected that dust will generally disperse quickly after traffic and will not reach concentrations harmful to human health and that the dust would not be of such quantity or travel distances to result in regional impacts or at levels that could affect the visibility in Class I Airsheds or other Wilderness areas on the Coconino National Forest.

The direct and indirect effects of Alternative B - Proposed Action on air quality would be minor and short-term increases in fugitive dust at pit sites and on haul routes. This alternative would have the effect of decreasing overall dust and particulate matter produced on unsurfaced forest roads as a result of decreased hauling. Where appropriate, projects that would require the use of rock surfacing would have dust control measures in place, such as watering the roads, which would minimize the generation of fugitive dust. Communities and counties in the project area do not regulate fugitive dust because it is not an air quality problem (JW Associates 2013b).

Table 8. Alternatives B and C - Estimate of Miles of Roads Requiring Surfacing².

Name	National Forest	Level 3 roads within 5 miles	Level 2 roads within 5 miles	Road Surfacing Estimate (miles)	Volume of Rock Needed (cu. yd.)
222 Pit	Coconino	37.1	159.0	53.0	48,367
Big Draw	Coconino	30.9	113.1	42.2	38,520
Big Ridge	Kaibab	9.3	244.7	33.8	30,818
Bushy Knoll	Coconino	20.3	177.3	38.0	34,706
Cinch Hook	Coconino	29.0	168.1	45.8	41,806
Deadhorse	Kaibab	28.8	165.6	45.4	41,395
Fues	Kaibab	6.8	96.7	16.5	15,030
Hostetter 2	Coconino	22.5	57.8	28.3	25,808
Jackass Knoll	Coconino	16.8	126.6	29.5	26,885
Kaibab Site 1-A	Kaibab	20.6	100.6	30.7	27,980
Kaibab Site 2-C	Kaibab	15.6	94.9	25.1	22,897
Kaibab Site 4-A	Kaibab	12.7	70.7	19.8	18,042
Lockwood	Coconino	33.4	131.9	46.6	42,518
Marteen	Kaibab	2.1	56.8	7.8	7,100
Moonset	Kaibab	26.4	129.3	39.3	35,892
Oak Grove	Coconino	17.1	73.9	24.5	22,349
Pine Hill Cinders	Coconino	3.4	31.6	6.6	5,987
Ruin	Kaibab	18.9	124.5	31.4	28,610
Thomas 2	Coconino	20.8	116.9	32.5	29,650
W Triangle	Kaibab	36.6	122.0	48.8	44,534
Totals		409.1	2,362.0	645.3	588,894
Annual Average				32.3	29,445

The following design criteria are part of Alternative B - Proposed Action:

1. Trucks hauling materials would follow all current rules regarding speed limits including no more than 25 miles per hour on all forest roads, and 10 miles per hour within 0.25 miles of all signed campgrounds and trailheads.
2. While in operation, roads would be watered to minimize dust as necessary.

² The pits selected for this estimate are one scenario of initial pit development that was used to estimate the number of roads that would need surfacing.

Cumulative Effects

Roads, Traffic and Safety

Appendix A includes all present and reasonably foreseeable projects within the project area that would have potential cumulative effects on roads, traffic and safety. Direct and indirect effects of Alternative B - Proposed Action combined with the effects of all present and reasonably foreseeable projects within the project area, would result in some short-term increases in traffic. However, those increases would be minor as compared to the existing traffic and would be dispersed through the two national forests. There would be approximately one-third the miles driven should Alternative B - Proposed Action be implemented as compared to Alternative A - No Action. Therefore, Alternative B - Proposed Action is less likely to combine with other projects to cause traffic bottlenecks for short periods of time in high-use areas on the two national forests. Alternative B - Proposed Action would not generate cumulative effects to safety because of the normal precautions that are used hauling materials on NFS roads, such as signage and speed restrictions.

Air Quality

Appendix A includes all present and reasonably foreseeable projects within the project area that would have potential cumulative effects on air quality. Direct and indirect effects of Alternative B - Proposed Action combined with the effects of all present and reasonably foreseeable projects within the project area, would result in some increases in fugitive dust. However, those increases would be minor, short-term and would be dispersed throughout the two national forests. Fugitive dust is not regulated in the project area based on the Regional Haze State Implementation Plan. Alternative B - Proposed Action could result in a cumulative increase in fugitive dust along roads that are not well surfaced that receive high recreation use. This cumulative effect would likely be very small because activities such as log hauling would primarily occur on the weekdays and include BMPs to minimize dust. However, the management of prescribed fires and wildfires for resource benefit could produce smoke and that could combine with the dust from regular weekday and weekend traffic to cumulatively decrease air quality where these activities are co-occurring for periods from several hours to several days.

3.2.2.3 Alternative C

Direct and Indirect Effects

Roads, Traffic and Safety

Direct effects of Alternative C would stem from the construction of approximately 0.41 miles of temporary roads and improvement of 3.25 miles of existing roads. The mileage of temporary roads is slightly less than Alternative B - Proposed Action because Youngs Pit is removed from this alternative. In the context of the more than 10,000 miles of existing roads (Table 7) these effects would be minor.

The number of miles driven to haul the material would be 39,260 miles, approximately one-third of the 117,779 miles required to haul the material for Alternative A - No Action and similar to Alternative B - Proposed Action. The effects of the proposed activities would be the same as discussed for Alternative.

Air Quality

The effects of Alternative C on Air Quality would be the same as discussed for Alternative B - Proposed Action.

Cumulative Effects

Roads, Traffic and Safety

The cumulative effects of Alternative C would be the same as discussed for Alternative B - Proposed Action.

Air Quality

The cumulative effects of Alternative C would be the same as discussed for Alternative B - Proposed Action.

3.3 RECREATION

3.3.1 EXISTING CONDITIONS FOR RECREATION

On the Coconino National Forest and Kaibab National Forest, there were an estimated 5,817,000 recreation site visits (5,541,000 and 276,000; respectively), based on the recent National Visitor Use Monitoring (NVUM) (USDA Forest Service 2011). The main activities of survey respondents who visited the Coconino National Forest were hiking or walking and viewing natural features, followed by relaxing, driving for pleasure and downhill skiing. On the Kaibab National Forest, hiking or walking and viewing natural features, were also the main activities of survey respondents, followed driving for pleasure, developed camping and viewing wildlife. On both forests, the most recent national visitor use monitoring surveys found that approximately 50% of forest visitors identified road condition as an issue of highest importance for forest managers to address.

3.3.1.1 Trails

There are numerous trails throughout the two National Forests, several of which are located within 0.5 miles or less of an existing or proposed rock pit. Existing pits that are within 0.5 miles of these trails include Cinch Hook, Big Ridge, Davenport, and Deadhorse. Proposed pits that are within 0.5 miles of these trails include Salmon Lake and Crazy Cow. These trails include the following:

General Crook Trail

A 138-mile long historic route that was originally over 200 miles in length and connected Fort Whipple to Fort Apache. Portions of the trail are located on the Coconino National Forest. The trail follows the Mogollon Rim, one of the more striking geologic features in Arizona, and frequently crosses FR 300, offering spectacular views of the state's central mountains and desert. A portion of this trail is located about 0.5 miles to the east of the existing Cinch Hook pit and less than 0.5 miles south of the proposed Salmon Lake pit.

The Arizona National Scenic Trail

A continuous, 800+ mile diverse and scenic trail across Arizona from Mexico to Utah that crosses through the Kaibab National Forest. It links deserts, mountains, canyons, communities and people. A portion of this trail is located approximately a quarter mile east of the existing Big Ridge pit.

The Overland Road Historic Trail

A trail that follows a route constructed in 1863 by the Army to connect the Beale Road with the growing community of Prescott. About 30 miles of the route is located on the Kaibab National Forest. The trail currently provides opportunities for mountain biking and horseback riding. A portion of the trail is located about 0.5 miles from the existing Davenport pit and one of its trailheads is located about 0.5 miles southwest of the existing Deadhorse pit.

The Tusayan Bike Trails

These are routes that offer a secluded forest experience for biking, hiking or horseback riding on old logging roads that meander through the Kaibab National Forest. The area bisected by these trails provides excellent opportunities for viewing wildlife. One segment of this trail system is located less than 0.5 miles to the north of the proposed Crazy Cow pit.

3.3.1.2 Wilderness Areas

There are three Wilderness Areas on the Coconino National Forest that are located within about one mile of an existing or proposed pit. One existing pit, Big Draw, is within one mile of the Red Rocks and Secret Mountain Wilderness Area. One existing pit, Cinch Hook, and one proposed pit, Hostetter 2, are within one mile of Fossil Springs and Kachina Peaks Wilderness Areas, respectively.

Red Rock Secret Mountain Wilderness Areas

This 49,950 acre area is located about 15 miles south of Flagstaff and about 2 miles from Sedona. This area provides for experiencing wilderness solitude, hiking and horseback riding, photography, viewing scenic rock formations, wildlife viewing, swimming, and viewing cultural resources. The boundary for these wilderness areas is located about one mile east of the existing Big Draw rock pit.

Fossil Springs Wilderness Area

This 11,550 acre wilderness area is located about 30 miles southeast of Camp Verde and 86 miles south of Flagstaff off paved and graveled roads. This wilderness area has some of the most diverse riparian areas in Arizona, including over thirty species of trees and shrubs and over a hundred species of birds. The area provides opportunities for sunbathing, wading, hiking, photography, viewing unique rock formations and bird watching. The boundary of this wilderness area is located approximately one mile west of the existing Cinch Hook rock pit.

Kachina Peaks Wilderness Area

This 18,960 acre wilderness area is located about six miles north of Flagstaff. The area includes most of the upper reaches of the San Francisco Peaks including Humphreys Peak. There are opportunities for wilderness solitude, hiking and horseback riding, viewing mountain scenery, wildlife, and fall colors. The boundary for the Kachina Peaks Wilderness Area is located about one mile southeast of the proposed Hostetter 2 pit. The location of the pit is separated from the Wilderness area by the 418 road, which is a frequently used forest system road.

3.3.1.3 Developed Recreation Areas

There are several developed recreation areas within proximity of a proposed or existing pit. On the Coconino National Forest, these include Stoneman Lake and Walnut Canyon National Monument. On the Kaibab National Forest, these developed recreation areas include Kaibab Lake Recreation Area and JD Dam.

Stoneman Lake Recreation Area

This lake is located 46 miles south of Flagstaff and includes a gravel boat ramp, parking area, picnic tables and vault toilets. There are picnic tables and fire rings on the northern and western sides of the lake. The lake is located about one mile northeast of the existing Oak Grove pit.

Walnut Canyon National Monument

This area is managed by the National Park Service (NPS). In 2012, the monument received approximately 110,000 recreational visitors (National Park Service 2012). The canyon contains cliff dwellings and other cultural artifacts and provides hiking and interpretive opportunities. There is no overnight use allowed at this NPS unit. The monument's eastern boundary is located approximately two miles from the proposed Youngs Canyon rock pit.

Kaibab Lake Recreation Area

This Recreation Area provides both day use and overnight facilities. It is located several miles from the town of Williams. The campground has been recently renovated and has 63 campsites with tables and fire rings along with two group areas. No utility hookups are available. Recently a new loop was added to the campground to increase capacity. The campsite has toilets and trash service, and potable water. There is a small boat ramp, and a wheelchair accessible fishing pier. This recreation area is located about one mile southwest of the existing Fues pit.

JD Dam

This Recreation Area lies 7 miles from Whitehorse Lake and is located about 20 miles southeast of Williams. Fishing is allowed but there is a catch-and-release policy in effect. Facilities are limited to parking, an outhouse, and trash receptacles. All camping must be done outside a 1/4 mile radius of JD Dam. This recreation site is located approximately 1.25 miles south of the existing Ruin pit.

3.3.1.4 Other Potentially Affected Recreation Resources

Dispersed Camping

Dispersed camping is a popular activity on the National Forests. Visitors may camp most anywhere on the Forest (unless otherwise posted) according to established guidelines

Placed Based Recreation

A study conducted by Brown and Reed (US Forest Service 2007) illustrated the diversity of values that Arizona residents living near the Coconino National Forest hold with respect to particular forest areas. Brown and Reed invited residents living near three national forests to identify and map their values using a web-based application. The San Francisco Peaks Area showed the most dense mapping of values followed by the Walnut Canyon Monument area, followed by the area south of Walnut Canyon and north of Mormon Lake, and then the area including and around Mormon Lake. The study results showed residents' density of values are not necessarily linked to particular developed recreation areas, but are distributed more broadly across the forest.

3.3.1.5 Existing Recreation Opportunity Spectrum

The Recreation Opportunity Spectrum is a classification system that describes different outdoor recreation settings across the National Forests using seven standard classes that range from primitive, undeveloped settings to urban, highly developed settings. Attributes typically considered in describing the settings are size, scenic quality, type and degree of access, remoteness, level of development, social encounters, and the amount of on-site management. ROS can be used to plan how areas should be managed for recreation in the future (US Forest Service 1986). A change in a national forest's mix of ROS classes would affect the recreation opportunities available.

The ROS classifications for existing pit locations, listed from more to less modified, include Roaded Modified, Roaded Natural, Roaded Natural/Semi-Primitive Motorized, Rural, and Semi-Primitive Motorized. The categories of Rural, Roaded Natural and Semi-primitive Motorized are characterized by natural appearing landscapes with a dominant sense of open space. Moving from Rural to Roaded Natural to Semi-primitive Motorized would reveal an increasingly natural appearing environment with decreasing evidence of modification. A Rural environment would have readily evident sights and sounds of human activity including obvious presence of roads and highways. However, there would also be a dominant presence of open or green space. A Semi-primitive landscape would appear primarily natural and human alterations to the landscape would not be dominant. Although motor vehicles would be present, roads would be more primitive.

There are 26 existing pits in the Project Area. Over 80 percent of those (21 pits) are located in the ROS setting of Roaded Natural, including all of the 12 existing rock pits on the Coconino National Forest. On the Kaibab National Forest, 9 pits are in Roaded Natural, one pit is in an area characterized as Roaded Modified, one in Semi-Primitive Motorized, two in Rural and one in Roaded Natural/Semi-Primitive Motorized (on the boundary between the two settings).

3.3.2 THE EFFECTS OF ALTERNATIVES ON RECREATION

3.3.2.1 Effects Common to All Alternatives

All alternatives would result in noise, dust, and traffic in the Project Area from hauling of road surface materials and from rock crushing, blasting, and sorting for the action alternatives. All alternatives would experience a temporary loss of access to desired recreation areas when rock pits are being used to mine and process roadbed material. There also would be potential safety issues when recreationists are using roads that are haul routes for roadbed material.

3.3.2.2 Alternative A - No Action

Direct and Indirect Effects

General Effects for Dispersed Recreation

If Alternative A - No Action were to be implemented, there would be rock mining, processing, and hauling activities at the few existing and currently operational rock pits. There would be no pit expansion. No new roads would be built so there would be longer haul distances than the action alternatives from existing rock pits to nearby commercial sources in Flagstaff, Verde Valley, and Winslow. Alternative A - No Action would therefore generate more traffic, noise and dust. The cost of road maintenance would be higher for Alternative A - No Action (More information in the SocioEconomics Specialist Report) so it is expected that this higher cost would likely mean that fewer miles of roads would be maintained. The direct and indirect effects of Alternative A - No Action would be to increase traffic and decrease road conditions throughout the Project Area. This is likely to affect recreation satisfaction of forest visitors since approximately half of forest visitors rated road condition the highest level of importance for management to focus on (USDAFS 2012).

Alternative A - No Action could cause a short term disruption of recreation uses and displacement of recreation users at and near the existing and operational pits during times when roadbed materials are being hauled. This alternative would concentrate rock mining, processing and hauling at currently operating pits, increasing the amount of time spent in each location and requiring more hauling from commercial sources since fewer pits would be available. Hauling times and distances would be greater than Alternatives B and C because fewer pits are used and they are more widely distributed. It is estimated that this alternative would require more than eight weeks of activity per year in the Project Area, while Alternatives B and C estimate about three to eight weeks. This would increase the length of time that recreationists could be displaced or disrupted over the action alternatives.

Effects to Identified Recreational Resources

Indirect effects associated with Alternative A - No Action would include dust and noise impacts to nearby trails and recreation areas. Three of the identified trails have existing rock pits within 0.5 miles of the trail, two wilderness areas have a pit located within 1 mile from their borders, and three recreation areas have a pit within 1.5 miles of their borders. Portions of the trails, Wilderness areas and recreation areas that are in proximity to these trails could experience increased dust, noise and perceptions of human activity when the

pits are operational. This alternative would not change the Wilderness character of either Wilderness area because the impact would be increased hauling, which may increase the intensity of dust or noise from roads near Wilderness, but would not introduce a new effect and thus not impact Wilderness character of either location. These effects would be temporary and short-term, although would be of longer duration with this alternative than the proposed action alternatives because of the concentration of activity at fewer pit locations. Table 9 summarizes the potentially affected recreational resources.

Recreational Opportunity Spectrum

On the Coconino National Forest all the 12 existing rock pits are located in Roaded Natural settings. Since the pits are located away from primary (sensitive) travel corridors, these would be in compliance with the setting characteristics.

Table 9. Effects of Alternative A - No Action on Identified Recreational Resources.

Recreational Resource	Number of Pits Potentially Affecting the Resource	Pit Names/Distance to Trail	Expansion or New Disturbance Area at Pit (acres)	Blasting at Pit?
General Crook Trail	1	Cinch Hook/0.5 miles	0.0	No
Arizona National Scenic Trail	1	Big Ridge/0.25 miles	0.0	No
Overland Road Historic Trail	2	Davenport/0.5 miles Dead Horse/0.5 miles	0.0 0.0	No No
Tusayan Bike Trails	0			
Red Rocks & Secret Mountain Wilderness Areas	1	Big Draw/1 mile	0.0	Yes
Fossil Springs Wilderness Area	1	Cinch Hook/1.0 miles	0.0	No
Kachina Wilderness Area	0			
Stoneman Lake Recreation Area	1	Oak Grove/ 1 mile	0.0	Yes
Kaibab Lake Recreation Area	1	Fues/1 mile	0.0	No
JD Dam	1	Ruin/1.25 mile	0.0	No
Walnut Canyon National Monument	0			

On the Kaibab National Forest 12 pits are located in Rural, Roaded Natural and Roaded Modified settings. One pit (Dog Knobs) is located in a Semi-Primitive Motorized ROS setting and the existing portion of one pit (Davenport) is located in the Semi-Primitive Motorized portion of a Roaded Natural/Semi-Primitive Motorized setting. The pits developed in Rural, Roaded Natural and Roaded Modified settings would be in compliance with the setting characteristics. However, the Dog Knobs Pit that is located in a Semi-primitive Motorized setting and the existing portion of the Davenport pit that is located in Semi-Primitive Motorized setting may not currently comply with guidance for the Kaibab National Forest. The Kaibab National Forest Recreation Opportunity Spectrum and Scenery Management System Guidebook (US Forest Service 2004) states the following:

“Discontinue common variety mineral material disposals from existing sources when permits expire, rehabilitate existing inactive materials pits and prevent development of potential new sites in foregrounds of sensitive travel corridors with Very High, High, and Moderate SIO and in Semi-primitive Non-motorized, Semi-primitive Motorized ROS classes, and in foregrounds of sensitive travel corridors in Roaded Natural and Rural ROS classifications”.

Continuation of any disturbances associated with the rock pits in Semi-primitive Motorized ROS would require use of an exception and documentation of this in the decision for this project (Kaibab National Forest Plan).³

Approximately 27.5 acres would be disturbed in association with continued use of these two rock pits. This is a small fraction of the more than 400,000 acres of Semi-Primitive Motorized lands that is the desired condition across the Kaibab National Forest (USDA Forest Service 2012).

Cumulative Effects

There are numerous other projects that would require the use of the same roads that are used to access recreational resources on the two national forests. Cumulative impacts are likely from the combined activities from this alternative and those required for large-scale forest restoration treatments such as the Four Forest Restoration Initiative. Approximately 500,000 acres, or slightly less than a quarter of the Coconino and South Kaibab National Forests, is expected to receive some form of thinning or prescribed fire restoration treatment over the next 20 years. Alternative A - No Action includes a substantial increase in road surfacing needs, requiring hauling on the same routes and at the same time as the hauling of log trucks and crews to implement forest restoration. Some existing pits such as Big Ridge would be well outside areas receiving restoration treatments, but all of the other existing pit locations are located within 10 miles of where these treatments would occur and thus would contribute to cumulative effects in hauling traffic.

The cumulative impact would be an increase in potential safety hazards such as dust and truck traffic to motorized recreation users, especially during duplicate hauling periods. However, this cumulative impact is

³ This would not be a Forest Plan Amendment, but an exception to the Recreation Opportunity Spectrum designations. The reason that this would not be a Forest Plan Amendment is because the Kaibab National Forest Plan recognizes that there will be circumstances where ROS designations will not be met and discusses that these may be expected when analyzed and documented in the NEPA process. A Forest Plan Amendment is required when standards in the Forest Plan cannot be met.

considered less than significant because of the long time frame and large area for implementation of the future foreseeable actions. If any activity from a particular project in combination with actions associated with existing rock pit activity were to affect recreational access, recreationists could find other areas on the two national forests with similar recreation opportunities. This would result in inconveniences, but would not prevent recreational use of the national forests.

3.3.2.3 Alternative B - Proposed Action

Direct and Indirect Effects

General Effects for Dispersed Recreation

Direct effects of Alternative B - Proposed Action would include disruption of recreation use at and near pits where roadbed materials are being mined and processed, and along haul routes that also provide recreational access. Access to desired recreation resources could be altered, requiring recreationists to use another route, or go to another recreation resource where access is not disrupted by hauling activities. There also could be safety impacts if recreationists are using the same roads that are used for hauling. Potential safety impacts to recreationists would be reduced by placing signs at major intersections on hauling routes during periods of active hauling.

Activities at the pits would involve 3-8 weeks of work removing material from the pits, blasting, hauling it to the crusher and stockpiling it. Hauling would be accomplished in about 2 weeks with 8-10 trucks completing several trips per day. Approximately 4 trucks per hour would enter and leave the site during the hauling period. Hauling would likely overlap somewhat with pit work. Typical pit development is anticipated to have two use periods of three weeks per year.

Several pits can be used as examples of how activities at individual pits could disrupt recreationists. The existing Oak Grove pit is located adjacent to Road 229, which is a popular route in the summer for access to dispersed camping and motorized recreation. Alternative B - Proposed Action proposes use and a 5.2 acre expansion of this pit. Activities in and around the Oak Grove pit could displace nearby dispersed campers within a surrounding quarter mile, which would affect approximately 5 known dispersed campsites. The existing Buck Butte pit is located several miles farther down Road 229. Alternative B - Proposed Action proposes an 8.7 acres expansion as well as use of this pit. The pit is 0.2 miles from the road, however, this portion of the road includes a designated area for dispersed motor vehicle camping. It is likely that the use of the area for motorized camping would be displaced during the operation and hauling from the pit. Salmon Lake pit is a new 10.8 acre pit proposed by this alternative and is located within 0.1 miles of a designated motorized 300-foot camping corridor along Road 677. Campers in this area would likely be displaced when this pit is in development or operation. The existing Macks pit (including a 4.6 acre expansion) and the proposed 10.7 acre Snafu pit are both located along Route 9363L, a designated dispersed camping corridor for motor vehicle use. Although this area is not especially popular, it would likely displace anyone wishing to camp within 0.25 miles of each pit site during development, operation and hauling from the pits.

The existing Cinch Hook Pit is a very popular snow play area. The pit has been closed intermittently for the last several years due to safety issues, vandalism, and sanitation concerns (USDA Forest Service 2012). The pit was most recently closed in December 2012 via a closure order citing these same concerns. Alternative B - Proposed Action proposes a 10.7 acre expansion of Cinch Hook Pit. Further development of this pit would preclude the potential for using the area as a snow play site during operation. This is not likely to result in much of an impact considering the pit is currently closed and operations at the pit would most likely occur during the spring, summer, and fall when there is no snow.⁴

The effects at, and in proximity to, active pits would be temporary and short-term. Recreational access would be disrupted up to 8 weeks per year. To minimize impacts to recreational use during peak use times, there would be no rock pit activities such as blasting, crushing, or sorting on Federal holidays.

Of the 39 existing or proposed pits, 17 would likely include some amount of blasting along with crushing to process materials for road surfacing. These include 222 Pit, Big Draw, Bushy Knoll, Hostetter 2, Crazy Cow, Jackass Knoll, Kaibab 1-A, Kaibab 2-C, Kaibab 4-A, Lockwood, Marteen, Oak Grove, Salmon Lake, Smoot Lake, Thomas 2, Turkey Knob, and Youngs Canyon. Blasting generally occurs through a qualified contractor. Blasting would generally be limited to the pit boundaries and include small charges that are used to fracture and separate layers of rock which are then pulled apart and crushed to an aggregate product small enough for road surfacing. Sound from the blasting depends on the technique used, distance, vegetation and surrounding topography. While some blasting techniques (such as the use of boulder busters) would result in no noise impacts outside the pit boundaries, it is estimated that noise from blasting could be mostly heard within 1/2 mile of a pit location. The likelihood of hearing blasting beyond that distance is not likely, but possible depending on site characteristics such as vegetation and topography.

This alternative would produce a beneficial indirect effect. Alternative B - Proposed Action would improve roads and therefore would improve driving conditions for recreationists. Pit location has been strategically designed throughout the south Kaibab and Coconino National Forests to minimize costs and hauling associated with road maintenance. It is expected that this alternative would improve road conditions, especially on Level 3⁵ main forest roads, on both the Coconino and Kaibab National Forests over the next 20 years. According to the National Visitor Use Monitoring Report (US Forest Service 2011a), approximately 50% of Coconino National Forest and Kaibab National Forest visitors identified road condition as highest importance for their national forest visit. Since this alternative would increase the capacity of the Coconino and Kaibab National Forests to maintain these roads, it is expected that this alternative would maintain or improve road conditions and thus the experience of forest visitors using these roads during the 20-year implementation period of this project.

⁴ The Coconino National Forest Schedule of Proposed Action also includes a proposal for the approval of rock crushing and material storage at the Cinch Hill rock pit site.

⁵ Level 3 roads refer to roads designated to be maintained for purposes of passenger car travel. These roads are regularly bladed or covered with road surfacing such as gravel.

Effects to Identified Recreational Resources

There are 12 rock pits located less than 1.25 miles from an identified recreational resource. Indirect effects associated with Alternative B - Proposed Action would include dust and noise impacts to these resources (Table 10). Portions of the trails, wilderness areas and recreation areas that are in proximity to these trails would be likely to experience increased dust, noise and perceptions of human activity.

Table 10. Effects of Alternative B - Proposed Action and Alternative C on Identified Recreational Resources⁶.

Recreational Resource	Number of Pits Potentially Affecting the Resource	Pit Names/Distance to Trail	Expansion or New Disturbance Area at Pit (acres)	Blasting at Pit?
General Crook Trail	2	Cinch Hook/0.5 miles Salmon Lake/0.5 miles	10.7 10.8	No Yes
Arizona National Scenic Trail	1	Big Ridge/0.25 miles	2.0	No
Overland Road Historic Trail	2	Davenport/0.5 miles Dead Horse/0.5 miles	2.7 7.6	No No
Tusayan Bike Trails	1	Crazy Cow/0.5 miles	14.9	Yes
Red Rocks & Secret Mountain Wilderness	1	Big Draw/1.0 mile	2.8	Yes
Fossil Springs Wilderness	1	Cinch Hook/1.0 mile	10.7	No
Kachina Peaks Wilderness	1	Hostetter 2/1.0 mile	9.7	No
Stoneman Lake Recreation Area	1	Oak Grove/ 1.0 mile	5.2	Yes
Kaibab Lake Recreation Area	1	Fues/1.0 mile	4.2	No
JD Dam	1	Ruin/1.25 mile	4.9	No
Walnut Canyon National Monument	1	Youngs Canyon/2.0 miles ⁷	11.0	Yes

⁶ Alternative C does not propose the development or use of Youngs Canyon pit which potentially effects Walnut Canyon National Monument.

⁷ Alternative B - Proposed Action only.

Salmon Lake, Crazy Cow, Big Draw, Oak Grove and Youngs Canyon pits would use blasting along with crushing to process materials for road surfacing. Salmon Lake and Crazy Cow are located within 0.5 mile from a recreational trail. Big Draw is one mile from the Red Rocks and Secret Mountain Wilderness Areas and Oak Grove is located one mile from the Stoneman Lake Recreation Area. Youngs Canyon is 2.0 miles from Walnut Canyon National Monument. For the trails, it is likely that blasting and crushing would be heard from portions of the trails for up to 8 weeks each year during operation of the pit. It is less likely but possible that blasting would be audible from the pits near the Wilderness Areas and the Recreation Area because the pits are located approximately one mile from the boundaries and separated by forested vegetation. Given the use of current blasting technology that allows small charges to fracture rock instead of use of less controlled blasting methods, it is highly unlikely that blasting would be audible for more than a mile from the pit site so any effects on these areas to recreationists would be very localized within their areas. Impacts from blasting would be mitigated during peak use times by prohibiting rock pit activities such as blasting, crushing, or sorting on summer weekends. This would reduce the noise, dust and user displacement during the highest recreation time periods.

The National Park Service has indicated concern about blasting at the Youngs Canyon pit and possible effects on prehistoric structures in the monument. These activities would require working with the National Monument to ensure the activities would not have negative effects on the cultural and natural values of the area. If the indirect effects of blasting can be mitigated, these indirect effects would be temporary and short-term, and therefore, would result in less than significant impacts. If the effects cannot be mitigated, there could be indirect effects to the National Monument from noise and vibrations, and Alternative B - Proposed Action would not be in compliance with Coconino Forest Plan direction. It is highly unlikely that the blasting at the pit would result in vibrations or noise that would impact prehistoric structures in the Walnut Canyon National Monument given that the Monument boundary is over a mile from the pit site, however, the occurrence of noise and/or vibrations from blasting or operation of the Young Canyon Pit would need to be mitigated or operation of this pit would be required to halt.

Based on the schedule of rock pit activities and the application of recreation related design features, impacts to the identified Recreational Trails, Wilderness Areas and Recreation Areas would be temporary, short-term, and therefore less than significant. Blasting and pit operation is located at a distance of approximately a mile of Wilderness boundaries and would be of short duration, and thus is not likely to result in impacts of a magnitude that would affect Wilderness character in the Fossil Springs, Kachina Peaks, or Red Rock Secret Mountain Wilderness areas.

Any identified potential impacts to the cultural values of Walnut Canyon National Monument would require mitigation such as the use of rock-fracturing technology rather than blasting with explosive devices. Based on these mitigations, impacts are not expected to result in noise or vibrations that could impact Walnut Canyon National Monument archeological resources or structures.

Table II. ROS Settings for Existing and Proposed Rock Pits.

Pit Name	Existing pit?	ROS Class	Expansion or New Disturbance Area (acres)	National Forest
222 Pit	Yes	Roaded Natural	0.0	Coconino
Big Aso	Yes	Roaded Natural	0.0	Kaibab
Big Draw	Yes	Roaded Natural	2.8	Coconino
Big Ridge	Yes	Roaded Natural	2.0	Kaibab
Buck Butte	Yes	Roaded Natural	8.7	Coconino
Bushy Knoll	No	Roaded Natural	13.8	Coconino
Cinch Hook	Yes	Roaded Natural	10.7	Coconino
Crazy Cow	No	Roaded Natural	14.9	Kaibab
Davenport	Yes	Roaded Natural/Semi-Primitive Motorized	6.9	Kaibab
Deadhorse	Yes	Roaded Natural	7.6	Kaibab
Dillman	Yes	Roaded Natural	2.4	Kaibab
Dog Knobs	Yes	Semi-Primitive Motorized	0.9	Kaibab
Double A	Yes	Roaded Natural	1.9	Kaibab
Fitzgerald	Yes	Roaded Modified	5.8	Kaibab
Fues	Yes	Roaded Natural	4.2	Kaibab
Hostetter 2	No	Roaded Natural	9.7	Coconino
Jackass Knoll	Yes	Roaded Natural	1.6	Kaibab
Kaibab Site 1-A	No	Roaded Natural	13.5	Kaibab
Kaibab Site 2-C	No	Roaded Natural	8.6	Kaibab
Kaibab Site 4-A	No	Roaded Natural	7.6	Kaibab
Lockwood	Yes	Roaded Natural	5.0	Coconino
Macks	Yes	Roaded Natural	4.6	Coconino
Marteen	No	Semi-Primitive Motorized	7.1	Kaibab
Moonset	Yes	Rural	0.0	Kaibab
Oak Grove	Yes	Roaded Natural	5.2	Coconino
Perry Lake	Yes	Roaded Natural	0.0	Coconino
Pine Hill Cinders	Yes	Roaded Natural	1.7	Coconino
Pittman Valley	Yes	Rural	1.5	Kaibab
Riordan Pit	Yes	Roaded Natural	0.0	Coconino
Ruin	Yes	Roaded Natural	4.9	Kaibab
Saddle Mtn. Cinders	Yes	Roaded Natural	0.0	Coconino
Salmon Lake	No	Roaded Natural	10.8	Coconino
Smoot Lake	No	Roaded Natural	11.1	Kaibab
Snafu	No	Roaded Natural	10.7	Coconino
Thomas 2	No	Roaded Natural	19.3	Coconino
Turkey Knob	No	Semi-Primitive Motorized	7.7	Coconino
W Triangle	Yes	Roaded Natural	4.3	Kaibab
Willard Springs	Yes	Roaded Natural	1.9	Coconino
Youngs Canyon	No	Roaded Natural	11.0	Coconino

Recreational Opportunity Spectrum

Table 11 presents the ROS settings for the pit locations on the Coconino and Kaibab National Forests. On the Coconino National Forest, all but one of the rock pits would be located in Roded Natural settings. Since these pits are located away from primary (sensitive) travel corridors, they would be in compliance with the setting characteristics. One new pit, Turkey Knob, would be located in the Semi-Primitive Motorized ROS class. Development this pit would result in a moderately dominant alteration to the natural setting. There are no developed recreation sites or trails immediately adjacent to the pit location. It is possible that tree removal and materials processing would be evident to occasional recreation users who may be traveling on access roads or using the area for dispersed recreation. While this meets the descriptions in the ROS guide and complies with the Coconino Forest Plan, this pit would be a priority for closure and reclamation when materials have been processed and the pit is no longer needed.

Two of the existing and proposed rock pits on the Kaibab National Forest are located in Rural settings (Moonset and Pittman Valley), one in Roded Modified (Fitzgerald), 15 in Roded Natural, one in Roded Natural/Semi-primitive Motorized (Davenport), and two in the Semi-primitive Motorized setting (Dog Knobs and Marteen). The pits that would be expanded, used or developed in Roded Modified, Rural and Roded Natural settings would be in compliance with the setting characteristics. However, the existing pits (Dog Knobs and a portion of the Davenport expansion) and the proposed pit (Marteen) that are located in Semi-primitive Motorized settings would require a project-level exception as discussed in the Kaibab National Forest Plan:

“The ROS-SMS Guidebook will be followed unless there is an exception made in a site- or project-specific analysis. Exceptions to Guidebook Guidelines will require documentation in project-level analysis, but will not require a Forest Plan amendment.”

The Kaibab National Forest Recreation Opportunity Spectrum and Scenery Management System Guidebook (US Forest Service 2004) states the following:

“Discontinue common variety mineral material disposals from existing sources when permits expire, rehabilitate existing inactive materials pits and prevent development of potential new sites in foregrounds of sensitive travel corridors with Very High, High, and Moderate SIO and in Semi-primitive Non-motorized, Semi-primitive Motorized ROS classes, and in foregrounds of sensitive travel corridors in Roded Natural and Rural ROS classifications”.

Based on this direction, an exception is required for the Dog Knobs and Marteen Pit expansions. The site-specific effects of this exception are discussed here.

The Semi-primitive Motorized ROS class is defined as, “Area is characterized by a predominantly natural or natural appearing environment of moderate-to-large size. Concentration of users is low, but there is often evidence of other users. The area is managed in such a way that minimum on-site controls and restrictions may be present but are subtle. Motorized use is permitted (USDAFS 1986).”

This alternative would disturb approximately 35 acres of the Semi-primitive Motorized ROS class through the development, expansion and use of these rock pits. This is 8 more SPM acres than would be affected by Alternative A - No Action. However, like Alternative A - No Action, this is a small fraction of the more than

400,000 acres of Semi-Primitive Motorized lands that is the desired condition across the Kaibab National Forest (USDA Forest Service 2012).

The Davenport Pit expansion is partially located in Semi-primitive Motorized at the location of a cinder pit between several cinder hills. The pit is accessed by and approximately one-third of a mile from County Road 73. The Davenport pit is located at the bottom of several cinder hills and with the surrounding Ponderosa pine vegetation is not visible from the road. The pit is likely only visible from nearby Davenport Knoll, which is surrounded by high clearance roads, but is generally not a vista point accessible through hiking trails or motorized means.

The pit expansions or development of Dog Knobs and Marteen would occur in pinyon-juniper vegetation types. Dog Knobs pit would be approximately 0.25 miles from Highway 180, which is a route used to travel between Flagstaff and the Grand Canyon. This pit is located on a cinder pit, which is visible from those driving on the road. It is likely that the pit itself won't be visible since the pit will be located above the line of sight from the road. However, when the pit is in operation, portions of equipment in the pit will likely be visible above the rim of the pit from the road. The Marteen pit is located on the northeast side of a small mountain adjacent to road 730. Forest Road 730 is a road maintained for high-clearance vehicles that gets a low concentration of users. It provides access to Laws Spring, which includes a 1 mile hiking trail for petroglyph viewing. Likely the entire pit would be visible from travelers driving by it on forest road 730.

Davenport, Dog Knobs and Marteen would maintain many of the characteristics identified for Semi-primitive Motorized areas including a low concentration of users, minor evidence of other users, and managed with low restrictions. The largest impact of these exceptions would be to the visual element of the ROS designation. Due to its location on the top of a cinder hill above Highway 180, the dog knobs pit would generally not be visible from the nearby highway when not in operation, but would be visible from surrounding cinder cones and high points on the nearby landscape. Marteen would result in a detracting of the natural appearing environment by travelers on forest road 730 and likely from other areas in the surrounding Spring Valley during both operation and afterward.

The three pits in Semi-primitive Motorized ROS classes would be highest priority for closure and rehabilitation when materials have been processed and the pits are no longer needed. These pits would be returned to acceptable conditions to meet semi-primitive motorized settings for natural appearance within 2-5 years of reclamation efforts.

Cumulative Effects

This analysis includes the potential cumulative effects to recreation during the 20-year implementation of this project. Where there are other overlapping activities occurring, cumulative effects from this project could occur as a result of hauling impacts to recreation access, impacts to recreation opportunity spectrum, and impacts from noise as a result of rock pit operations.

There are numerous other projects that would require the use of roads that provide access to recreational resources on the two national forests. Forest restoration and fuels reduction activities including the Four Forest Restoration Initiative, Turkey-Barney Pasture Watershed Health, Mahan-Landmark Forest

Restoration, Wing Mountain Forest Health, Upper Beaver Creek Watershed Health, Clints Well Forest Restoration, McCracken Forest Restoration Project, Marshall Forest Restoration Project, and Hart Prairie Restoration Project, Tipover Timber Stand Improvement Project, Watts Vegetation Management Project, Bill Williams Mountain Restoration Project and others will result in hauling of log trucks and increased traffic. Cumulative impacts are likely from the combined road use from this alternative and those required for large-scale forest restoration treatments. Approximately 500,000 acres, or slightly less than a quarter of the Coconino and South Kaibab National Forests, will receive some form of thinning or prescribed fire restoration treatment over the next 20 years. Like Alternative A - No Action, Alternative B - Proposed Action requires hauling on the same routes and at the same time as the hauling of log trucks and crews to implement forest restoration. Some pits such as Salmon Lake, Youngs Canyon, and Big Ridge would be well outside areas receiving restoration treatments, but many of the other existing and proposed pit locations are located within 10 miles of where these treatments would occur.

A specific example of a potential for cumulative effects includes Saddle Mountain Cinders and 222 Pit rock pits, which could be operating at the same time as the implementation of the Wing Mountain Restoration and Fuels Reduction Project. These combined activities would result in a cumulative increase in hauling with large trucks that would likely be noticeable on State Highway 180. The combined activities could also create delays or closures in areas directly north and east of Wing Mountain. This could affect recreationists using the area for dispersed camping. If Deadhorse, Davenport, and Jackass Knoll Pits are operating at the same time, there could be further cumulative traffic impacts along State Route 73, which would affect recreational activities such as driving for pleasure. This route also occurs near the Bill Williams Mountain Restoration Project and the Watts Vegetation Management Project, potentially causing closures and traffic disruptions that could displace recreational activity on certain portions of the mountain for up to two years.

Cumulative impacts would also include an increase in potential safety hazards such as dust and truck traffic to motorized recreation users, especially during duplicate hauling periods. However, this cumulative impact is considered less than significant because of the long time frame and large area for implementation of the future foreseeable actions. If any activity from a particular project in combination with actions associated with existing rock pit activity were to affect recreational access, recreationists could find other areas on the two national forests with similar recreation opportunities.

Noise from pit blasting and crushing could result in cumulative noise impacts in some situations. Should noise from blasting operations, crushing or sorting at the Young's canyon pit be noticeable from the Walnut Canyon National Monument, it is likely there would be a cumulative effect from the recent development of a shooting range by the Arizona Game and Fish Department approximately one mile south of the Monument. While the shooting range has generally mitigated almost all noise from reaching the Monument visitor center and other areas with regular public use, it is possible that some of the noise from shooting could be heard by those in the Monument given directional winds. Should operations from the Young's canyon pit be audible from the Monument, there could be a temporary cumulative impact from non-natural noises being audible in the Walnut Canyon National Monument.

There could be a cumulative impact to the Recreation Opportunity Spectrum (ROS) Semi-primitive motorized setting from the Turkey Knob pit combined with the Mahan Forest Restoration project. The

Turkey Knob pit location is approximately one mile from the southeast boundary of the Mahan Forest Restoration project. If activities from these two projects are occurring at the same time, the area would appear to be more clearly influenced by management which would reduce the natural appearance of the area. This impact would likely be limited to one or two years during implementation of the Mahan Forest Restoration treatments.

Other cumulative impacts to the ROS Semi-primitive motorized setting would include the combined effects of the Dog Knobs and Davenport Expansions, development of the Marteen Pit and use of the Turkey Knob pit, when combined with other existing pits located in areas designated as Semi-primitive motorized. These expansions, however, would be of the same nature and effect as the previous existing pits and would be limited in size and to a few years.

There could also be cumulative impacts from implementation of the 2005 Travel Management Rule. The recent decision for this rule limits motor vehicle use by requiring motor vehicles to stay on designated roads, trails, and areas, which indirectly limits the areas used for dispersed camping. Several rock pits, including Snafu, Macks, Oak Grove, Salmon Lake, and Buck Butte are located adjacent to or within areas designated for dispersed car camping. Use of these pits would reduce the area available to camp that are accessible on these designated routes. Implementation of the Travel Management Rule combined with activities at the pits could displace dispersed car camping on up to 6 miles of road, or approximately 1% of the designated dispersed camping areas on the Coconino National Forest. While it is unlikely all of these pits would be operating at the same time, it is possible that more than one could temporarily (up to 8 weeks) reduce dispersed car camping opportunities on the forest.

3.3.2.4 Alternative C

Direct and Indirect Effects

General Effects for Dispersed Recreation

The direct and indirect effects of Alternative C would be of the same type and of the same duration as those described for Alternative B - Proposed Action. Potential indirect effects to Walnut Canyon National Monument would be eliminated since the Youngs Canyon rock pit would not be developed. Therefore, overall indirect effects would be less for Alternative C as compared to Alternative B - Proposed Action.

Alternative C would also reclaim about 114 acres at seven rock pits. For visitors desiring a more natural appearing landscape, reclamation would have a beneficial impact. If the rock pits undergoing reclamation are used for recreation (such as recreational shooting), there could be an adverse impact to users of these pits during the reclamation activities. Since many of these pits would likely be blocked from vehicular access after reclamation, those who use these pits for recreational shooting would likely be affected and would need to use another location. Given the number of other rock pits and additional areas on the Forest that could be used for recreational shooting, this impact would be less than significant.

Effects to Identified Recreational Resources

Potential indirect effects to Walnut Canyon National Monument would be eliminated since the Youngs Canyon rock pit would not be developed. Therefore, overall effects to identified recreational resources would be less for Alternative C as compared to Alternative B - Proposed Action.

Recreation Opportunity Spectrum

The effects to the ROS classes would be the same as discussed for Alternative B - Proposed Action except there would be slightly fewer direct effects to the Roaded Natural areas. Youngs Canyon rock pit is eliminated from this alternative reducing the amount of disturbance in the Roaded Natural classification by 11 acres.

Cumulative Effects

The cumulative effects of Alternative C would be very similar as discussed for Alternative B - Proposed Action. The only difference is that the Youngs Canyon Pit would not be developed so the potential for cumulative impacts from noise associated with this pit in combination with noise from a shooting range would not exist.

3.4 VISUAL RESOURCES ---

Visual resources on the Coconino and Kaibab national forest are highly diverse and have high scenic attractiveness. Oak Creek Vista, Canyon Vista near Mormon Lake Red Rock-Secret Mountain Wilderness, views of the San Francisco Peaks. Viewsheds include relatively undeveloped settings in areas such as Barbershop Canyon or the Red Rocks-Secret Mountain Wilderness Area. Other scenic resources include Red Rock Canyon, and the Grand Canyon viewable from south and north rims on the Kaibab National Forest. Scenery varies from desert landscapes with canyons, rock formations and sparse vegetation, to aspen- fir forests in mountainous terrain. The Mogollon Rim is a major visual feature dominating the Coconino National Forest. Much of the analysis area above the Mogollon Rim is a high plateau dominated by ponderosa pine with Gambel oak understory. These diverse landscapes provide a variety of high quality viewing opportunities to visitors and nearby residents alike.

3.4.1 EXISTING CONDITIONS FOR VISUAL RESOURCES

3.4.1.1 Potentially Affected Recreational Resources and Trails

Coconino National Forest

General Crook Trail

This 138-mile long historic route was originally over 200 miles in length and connected Fort Whipple to Fort Apache. Portions of the trail are located on the Coconino National Forest. The trail follows the Mogollon

Rim, one of the more striking geologic features in Arizona, and frequently crosses FR 300, hugging the rim to offer spectacular views of the state's central mountains and desert. The Four Peaks, Sierra Anchas and Mazatzals stand out among the scenery. At night, lights from Payson sparkle from 2,000 feet below and 15 miles away.

Stoneman Lake Recreation Area

This lake, located 46 miles south of Flagstaff, is a naturally occurring body of water at the bottom of a large bowl-shaped valley. It is surrounded by Gambel oak and ponderosa pine covered basalt slopes and is an excellent place to bird watch. With the exception of a few cabins dotting the east shoreline, the view has changed little since the Hopi Indians led Spanish explorer Antonio de Espejo to the lake in 1583.

Red Rocks and Secret Mountain Wilderness Areas

This 49,950 acre combined area is located about 15 miles south of Flagstaff and about 2 miles from Sedona. These wilderness areas include a collection of magnificent cliffs, buttes, and canyons. Red is the predominant hue here among the wind and water sculpted pinnacles, windows, arches, and slot canyons. The area is criss-crossed with trails that take you everywhere from the deepest gorges to the most prominent panoramas. These two areas provide opportunities for experiencing wilderness solitude, hiking and horseback riding, photography, viewing scenic rock formations, wildlife viewing, swimming, and viewing cultural resources.

Kachina Peaks Wilderness Area

This 18,960 acre wilderness area is located about six miles north of Flagstaff. The area includes most of the upper reaches of the San Francisco Peaks including Humphreys Peak. There are opportunities for wilderness solitude, hiking and horseback riding, viewing mountain scenery, wildlife, and fall colors.

Rock Crossing Campground

Rock Crossing Campground is a recently renovated campground that is located 2 miles from Blue Ridge Reservoir. This narrow, winding body of water looks more like a canyon-bound river than a lake. Nestled between forested canyon walls it provides picturesque water recreation in a secluded, wooded setting.

Kaibab National Forest

Arizona National Scenic Trail

The Arizona National Scenic Trail is a continuous, over 800 mile diverse and scenic trail across Arizona from Mexico to Utah that crosses through the Kaibab National Forest. It links deserts, mountains, canyons, communities and people. The visual features of the Arizona Trail are diverse and include historic sites, diverse natural features and geologic wonders, quaint communities and large remote wilderness areas. Prehistoric and historic sites are found along the entire length of the trail.

Overland Road Historic Trail

The Overland Road Historic Trail follows a route constructed in 1863 by the Army to connect the Beale Road with the growing community of Prescott. About 30 miles of the route is located on the Kaibab National Forest. Traveling along the trail from east to west, a visitor first experiences the wide grasslands of Garland Prairie and sparsely populated with active and deserted hardscrabble homesteads. Farther along, the trail enters the trees where numerous other historic sites are found including the scenic Pomeroy Tanks

Tusayan Bike Trails

These are routes that offer a secluded forest experience for biking, hiking or horseback riding on old logging roads that meander through the Kaibab National Forest. The area bisected by these trails provides excellent opportunities for viewing wildlife such as elk, deer, hawks, eagles, antelope and many others.

Kaibab Lake Recreation Area

This Recreation Area provides both day use and overnight facilities. It is located several miles from the town of Williams. Kaibab Lake sits at an elevation of 6,800 feet, and pine forests and grass line its shores, while wildflowers add extra color to the landscape in late spring and early summer.

JD Dam

This Recreation Area lies 7 miles from Whitehorse Lake and is located about 20 miles southeast of Williams. It is a small but pretty lake with reeds and water lilies surrounded by a pine forest.

3.4.1.2 Potentially Affected Scenic Highways and Travel Routes

Coconino National Forest

Historic Route 66

Historic Route 66 All-American Road (Ash Fork to Lupton) is about 30 miles in length. Route 66 became known as both the "Main Street of America" and the "Mother Road." For Dust Bowl refugees, wartime jobseekers and families on vacation, Route 66 became the primary route across America. Arizona's portion of the old road contains plentiful reminders of that long-ago era.

Red Rock All American Road/State Route 179

Red Rock All-American Road is located on State Route 179, and is 7.5 miles in length. This scenic drive traces one of the oldest routes in Red Rock Country. It bisects areas of castle-like buttes and spires, where the landscape is striped and blended in multiple hues of reds, oranges, and browns.

San Francisco Peaks Scenic Road/US 180

This portion of US 180 is 31 miles in length and includes the first spectacular leg on the journey from Flagstaff to the Grand Canyon. It is part of the path that links the San Francisco Peaks and the Canyon, the two greatest wonders of beauty and enormity on the Colorado Plateau. The Scenic Road designation begins a few

miles north of Flagstaff on US Route 180. The route skirts the lofty San Francisco Peaks, sweeps through thick forests of aspens and ponderosas, then descends into natural appearing juniper and piñon pine forests, passing the impressive Kendrick Peak and Red Mountain. The scenic route then ends a few miles before the junction with State Route 64 in Valle, where travelers can head north to the Grand Canyon.

As the scenic road proceeds northwest, the towering San Francisco Peaks dominate the stunning drive. Mount Humphreys, Arizona's highest point at 12,633 feet, is the most notable view along the route. Mt. Humphreys and the other peaks, Fremont and Agassiz are the jagged maw of a volcano that has erupted repeatedly over the last 3 million years, most recently about 220,000 years ago. Geologists have speculated that the peaks once stood more than 15,000 feet tall before the eruptions. The volcano is part of the 1,800-square-mile San Francisco Volcanic Field, which has been active for 6 million years and consists of hundreds of cinder cones and lava flows, including Sunset Crater a few miles to the East.

Sedona – Oak Creek Scenic Road/State Route 89A

The Sedona - Oak Creek Canyon Scenic Road is located on State Route 89A, and covers approximately 15 miles. This scenic route begins in Red Rock Country and climbs 4,500 feet beside Oak Creek into pine-fir forests more than a mile high. The roadway curves through prickly pear cacti and yuccas scattered among the cottonwood, ash and sycamore trees along Oak Creek. In the higher elevations, the cacti and riparian growth give way to junipers and oaks. Oak Creek rushes through the orange and red canyon walls of Sedona. As the road climbs north into the mountains toward Flagstaff, the desert scrub gives way to pinyon pines, junipers, evergreen oaks and other trees, enveloping the roadside with a canopy of leaves and needles. This area supports a number of plant-life communities because of the rich riparian ecology. Oak Creek is spring-fed, and also drains a large portion of the area above the Mogollon Rim. Tall ponderosa pines forest begins to appear, leading into a forest of Douglas and white fir as well as Gambel oak. From the yellow-gold hues of fall and the bright wildflower splashes of spring to the white snow of winter, a multitude of colors brightens this scenic drive.

The Sedona-Oak Creek Canyon Scenic Road provides a riparian habitat for many wildlife species as well as many native plants and cacti. Temperatures and rainfall vary greatly as the elevation changes through the canyon, making it possible to support seven different plant life zones in less than 15 miles. Starting in Sedona, the road follows the canyon walls north through the lush greenery. During spring one can view a multitude of colors from wildflowers in bloom. Driving the Oak Creek Sedona Canyon Road in autumn provides excellent opportunities to view fall colors.

Kaibab National Forest

Fredonia - Vermillion Cliffs Scenic Road/US Route 89A

The Fredonia - Vermillion Cliffs Scenic Road (US 89A) is 82 miles in length. This scenic route starts at Bitter Springs and rises to the grassy plains and pine forests of the Kaibab Plateau. The Arizona Strip's otherworldly terrain promises sunset colors of red rust, bright red, purple, yellow and green.

Kaibab Plateau - North Rim National Scenic Byway/State Route 67

The Kaibab Plateau - North Rim National Scenic Byway is located on State Route 67, covering a length of 30.3 miles. This scenic road winds through the pristine heart of the Kaibab Plateau's bountiful forests and yawning meadows as it reaches out for the little-visited North Rim of the Grand Canyon.

3.4.2 THE EFFECTS OF ALTERNATIVES ON VISUAL RESOURCES

3.4.2.1 Effects Common to All Alternatives

Effects common to all alternatives include views of exposed soil at active rock pits locations, and removed vegetation. Active pits would also have processing and mining equipment, and trucks for hauling roadbed material to desired locations.

None of the Alternatives would have the potential for effects on several of the visually sensitive recreational resources because none propose use of an existing pit or development of a new pit within 0.5 miles of the resource. These resources include:

- Stoneman Lake
- Red Rocks and Secret Mountain Wilderness Areas
- Kachina Peaks Wilderness Area
- Kaibab Lake Recreational Area
- JD Dam
- Rock Crossing Campground

None of the Alternatives would have the potential for effects on several of the visually sensitive travelways because none propose use of an existing pit or development of a new pit within 0.5 miles of the resource.

These travelways include:

- Red Rocks All American Road (State Route 179)
- Sedona-Oak Scenic Road (State Route 89A)
- Fredonia-Vermillion Cliffs Scenic Road (US Route 89A)
- Kaibab Plateau-North Rim Scenic Byway (State Route 67)

3.4.2.2 Alternative A - No Action

Direct and Indirect Effects

Alternative A - No Action would continue to mine and process roadbed materials from the 26 existing pits. Direct effects to visually sensitive areas would be views of exposed soil, removed vegetation, and of trucks and other equipment used to mine and process roadbed material. The magnitude of these direct effects would vary depending on the duration of activities at each existing pit, the number of viewers that are able to see the exposed soil, removed vegetation and equipment, and the distance from which viewers can observe these project related activities. Indirect effects would include long-term views of the pits following mining activity and before re-vegetation efforts have been completed. However, given the dispersed nature of recreational use on the two national forests, and the dispersed nature of rock pit activity, there would be few times over the

20-year planning period when recreationists would be able to view mining and processing activities. Therefore, the duration of impacts would be low.

Mining and processing activities that occur at any of the pits within 0.5 miles of scenic routes or major travelways, or within 0.5 miles of recreation resource areas (Table 12), could cause adverse, temporary impacts. The importance of these impacts can be evaluated in terms of their consistency with Scenic Integrity Objectives (SIOs). Actively mined pits are consistent with the SIO of “moderate” since the landscape may appear slightly altered and the pits are visually subordinate when viewed from distances of greater than 0.5 miles, which is the breakpoint between the foreground and middle-ground distances (US Forest Service 1996). Table 12 displays SIOs in the areas where the pits are located, and the distances from rock pits to scenic routes, major travelways, and developed recreation resources. Most pits are located in forested areas making them difficult to view even from a foreground distance (300 feet to 0.5 miles). There are 6 existing pits that may be viewed from 0.5 miles or less from developed trails, including Big Ridge, Cinch Hook, Crazy Cow, Davenport, Deadhorse, and Salmon Lake. There are 8 existing pits that may be viewed 0.5 miles from scenic routes or travelways including Cinch Hook, Dog Knobs, Fues, Hostetter 2, Macks, Riordan, Snafu and Willard Springs.⁸

Of the 13 existing pits located within a distance of 0.5 miles or less to visually sensitive areas (including travelways and recreational resources), six also fall into an area designated with a “High” SIO. These pits include Big Ridge, Cinch Hook, Davenport, Deadhorse, Dog Knobs and Fues. In these cases, mining activities would not be consistent with the designated SIO, when viewed from a foreground distance (0 feet to 0.5 miles). Therefore, for these pits there would be temporary but adverse visual impacts as determined with consistency with SIOs. This alternative would not provide for reclamation activities and, therefore, this visual impact would continue over the next several years.

Cumulative Effects

There are numerous current and future foreseeable projects that have the potential to affect visual resources (Appendix A). Projects such as the Four Forest Restoration Initiative EIS will alter the appearance of the landscape where vegetation removal activities will be conducted. Similar to this project, vegetation removal activities that are very close (300 feet or less) to scenic highways, major travelways and recreation resources, will have temporary, but adverse effects to visually sensitive areas. Therefore, there would be cumulative impacts to visually sensitive areas when all other projects are considered in combination with the No Action alternative.

⁸ The analysis evaluated all impacts for rock pits that lie within 0.5 miles of scenic highways, major travelways, and developed recreation resources and trails. This distance was chosen since it represents the maximum foreground distance from potential viewers to the characteristic landscape.

Table 12. Proximity to Recreation Resources, Scenic Highways, and Major Travelways.

Pit Name	Existing Pit?	Scenic Integrity Objective	Meets Analysis Criteria?	Distance to Developed Recreation Resources	Distance to Scenic Byway, Major Travel Route or Other Sensitive Scenic Areas
Big Aso	Yes	M		Greater than 4 miles	Greater than 4 miles
Big Draw	Yes	M		1 mile from the boundary of the Red Rocks/Secret Mountain	Greater than 4 miles
Big Ridge	Yes	H	P	0.25 miles from a portion of the Arizona trail	1.5 miles from Highway 89A
Buck Butte	Yes	M		Greater than 4 miles	3 miles from Forest Road 3
Bushy Knoll	No	M		Greater than 1.5 miles	1.5 miles from Forest Road 3
Cinch Hook	Yes	H	P	0.5 miles from a portion of the General Crook Trail	0.25 mile from intersection of Highways 260 and 87.
Crazy Cow	No	M	P	0.5 miles from one of the Tusayan bike trails	2 miles from Grand Canyon National Park boundary
Davenport	Yes	H	P	0.5 miles from a portion of the Overland Road Historic Trail	Greater than 4 miles
Deadhorse	Yes	H	P	0.5 miles from one of the trailheads for the Overland Road Historic Trail	Greater than 4 miles
Dillman	Yes	M		Greater than 1.5 miles	Greater than 4 miles
Dog Knobs	Yes	H	P	Greater than 2 miles	0.25 miles from Highway 180
Double A	Yes	H		Greater than 4 miles	Greater than 4 miles
Fitzgerald	Yes	L		Greater than 2 miles	Greater than 4 miles
Fues	Yes	H	P	1 mile from Kaibab Lake Recreation Area	0.5 miles from Highway 64
Hostetter 2	No	M	P	1 mile from the boundary to the Kachina Peaks Wilderness Area	Greater than 4 miles from major travelway but located directly along FR 418 in area of High SIO
Jackass Knoll	Yes	M		Greater than 1.5 miles	Greater than 4 miles
Kaibab 1-A	No	M		Greater than 1.5 miles	4 miles from Highway 180
Kaibab 2-C	No	M		Greater than 1.5 miles	Greater than 4 miles
Kaibab 4-A	No	M		Greater than 1.5 miles	3 miles from Highway 180
Lockwood	Yes	H		2 miles from Rock Crossing Campground	Greater than 4 miles
Macks	Yes	M	P	Greater than 1.5 miles	0.5 miles from Forest Road 3
Marteen	No	M		Greater than 1.5 miles	Greater than 4 miles
Moonset	Yes	H		Greater than 1.5 miles	1 mile from Interstate 40
Oak Grove	Yes	H		1 mile from Stoneman Lake	Greater than 4 miles
Perry Lake	Yes	H		Greater than 1.5 miles	3 miles from Forest Road 3
Pine Hill Cinders	Yes	H		Greater than 1.5 miles	1 mile from Forest Road 3
Pittman Valley	Yes	H		Greater than 1.5 miles	1 mile from Interstate 40, 0.5 miles from Route 66
Riordan	Yes	M	P	Greater than 1.5 miles	0.5 miles from Interstate 40 and Historic Route 66
Ruin	Yes	M		1.25 miles from JD Dam	Greater than 4 miles

Table 12. Proximity to Recreation Resources, Scenic Highways, and Major Travelways.

Pit Name	Existing Pit?	Scenic Integrity Objective	Meets Analysis Criteria?	Distance to Developed Recreation Resources	Distance to Scenic Byway, Major Travel Route or Other Sensitive Scenic Areas
Saddle Mtn Cinders	Yes	H		Greater than 4 miles	Greater than 4 miles
Salmon Lake	No	M	P	0.5 miles from a portion of the General Crook Trail	Less than 1 mile from Highway 260
Smoot Lake	No	M		Greater than 1.5 miles	Greater than 4 miles
Snafu	No	M	P	Greater than 1.5 miles	0.5 miles from Forest Road 3
Thomas 2	No	H		Greater than 1.5 miles	Greater than 4 miles
Turkey Knob	No	M		Greater than 1.5 miles	Greater than 4 miles
W Triangle	Yes	H		Greater than 4 miles	Greater than 4 miles
Willard Springs	Yes	M	P	Greater than 1.5 miles	0.5 miles from Interstate 17
Youngs Canyon	No	M		2 miles from boundary of Walnut Canyon National Monument	Greater than 3 miles
222	Yes	M		Greater than 4 miles	1.5 miles from Highway 180

3.4.2.3 Alternative B - Proposed Action

Direct and Indirect Effects

Due to the relatively small footprint and locations of the proposed rock pits on the landscape, most direct and indirect visual impacts are very limited to where the pit can be seen from secondary or tertiary forest roads. Out of the proposed 39 pits, there are 13 pits that are located within 0.5 miles of major travelways, scenic byways, trails, recreation sites, or other sensitive scenic areas. Of those 13 proposed pits 9 of them are well-established pits that have been in use for decades. Most of the pits that are located next to a major roadway, recreation site, or trail were initially used to provide material to construct these same roadways, recreation site, or trail. Often the rock pit was built very near the road or trail but in an area not visible to provide for a convenient material source without impacting the viewshed. Pits near sensitive areas are discussed below:

Big Ridge

This proposed pit expansion is located within 0.25 miles of the Arizona National Scenic Trail. Big Ridge is an existing pit that has been the main rock source for the Jacob Lake campground and surrounding facilities on the North Kaibab Ranger District. The proposed expansion would increase the pit by 2.0 acres or 25 percent. The expansion would be on the side of a hill above and facing away from the Arizona National Scenic Trail. It is unlikely that the pit or expansion would be visible to hikers on the trail.

Cinch Hook

This is an existing pit on the Mogollon Rim accessible from the south side of State Highway 87, near the junction with State Highway 260. The pit is mostly blocked from view by the intermediate and older

Ponderosa pines along the road, but it can be seen when passing the short, paved access road. The proposed 10.7 acre expansion to this pit would occur to the south and west of the pit, opposite Highway 87. Thus, the entire expansion is not expected to be visible from the nearby major travelway. The Coconino National Forest Schedule of Proposed Actions includes a current proposal to authorize additional rock crushing and material storage within the existing boundary of the pit.

Crazy Cow

This is a proposed new pit that would be located approximately 0.2 miles from the Tusayan bike trails at their closest point. The bike trails are open March through October and offer a secluded riding experience on old logging roads through mixed Ponderosa pine and juniper woodlands. Near the pit, the trail travels through dense pinyon-juniper woodlands and is generally at the same elevation. Therefore, it is unlikely that pit could be seen from the trail. However, it is likely that parts of the pit could be visible in glimpses between the trees while traveling on the trail, especially during pit operation.

This pit is also within 2 miles of the Grand Canyon National Park boundary. Due to the dense vegetation, distance and topography, the proposed pit would not be visible to Park visitors.

Davenport

The proposed expansion of Davenport Pit is located 0.48 miles from the Overland Road Historic Trail. This trail is currently managed as a 25 mile, one-way, backcountry hiking route, along an old wagon road from the 1850s. The current 8.5 acre pit is not visible from the trail. The proposed 7 acre expansion is very unlikely to be visible from the trail due to the dense pine forest and topography.

Deadhorse

This proposed pit expansion is located 0.68 miles from the Overland Road Historic Trail. The proposed expansion is located on the side of a small cinder cone opposite the trail. The new disturbance area would not be visible from the Overland Historic Trail.

Dog Knobs

The proposed 0.9 acre expansion of this pit is located 0.25 miles from Highway 180. This pit is located in an area designated with a High SIO. The existing pit is not visible and the expansion would not be visible from Highway 180.

Fues

This pit expansion would occur along the slope of a cinder cone. The expansion area would be on the slope of the cinder cone facing away from Kaibab Lake and Highway 64 and would not be visible to these nearby viewing areas.

Hostetter 2

This proposed new pit is located north of the San Francisco Peaks and along Forest Road 418, a native surface and graveled secondary road. Although the pit is located in Ponderosa pine habitat and would be screened by

300-500 feet of trees, there is concern that the pit would still be plainly visible since the trees are still young and well-spaced. Public comments identified the potential visibility of this proposed pit as a visual concern.

Approximately 6.5 acres of the 9.7 acre proposed pit are designated with a Moderate SIO. The remaining 3.2 acres are defined with a High SIO. The development of the pit is expected to meet the Moderate SIO because while there would be noticeable deviations of the landscape, the valued landscape character would appear only slightly altered. As the on-site trees grow and become more of a closed canopy, the pit would become less visible from nearby forest road 418. While this pit may be visible from portions of nearby Forest Roads 418 and 419, the pit is not likely to be seen from many other locations since it would be on a slope facing away from the San Francisco Peaks.

Approximately 3.2 acres of the Hostetter 2 Pit is located in an area designated with a High SIO. While the pit would be screened by existing trees on-site, the young age of the Forest would not provide enough of a screen to prevent the pit from affecting the foreground view from forest road 418. In areas managed for high scenic objectives, deviations may be present, but must repeat the form, line, color, texture, and pattern common to the landscape character so completely and at such a scale that they are not evident. Since this pit would clearly be evident from forest road 418, this portion of the pit would not meet the current level of scenic integrity objectives during the pits development and operation. It is expected that the pit would meet high scenic integrity objectives within two years of reclamation efforts.

In situations where a proposal does not meet scenic integrity objectives or visual quality objectives, the plan allows for “one classification movement downward... (US Forest Service 1987-2008, p. 60)”. This proposal would include moving 3.2 acres of land one classification downward from High to Moderate Scenic Integrity.

Macks

This existing 0.5 acre pit would be expanded by 4.6 acres to a total size of 5.1 acres. It is located approximately one-third mile west of the Snafu pit. Macks would likely not be visible from Lake Mary Road due to topography, but would be very visible from the secondary Forest Road 9363L. While Forest Road 9363L is not a major travelway and does not provide connectivity to other forest roads, it is designated as a motor vehicle camping corridor and would impact the view of those who camp along this road. The pit is located in an area designated as Moderate Scenic Integrity. The development of the pit is expected to meet the Moderate Scenic Integrity because while there would be noticeable deviations of the landscape, the valued landscape character would appear only slightly altered.

Riordon

This pit is a major aggregate material source that has been used for several decades. The pit is 0.26 miles from Interstate 40 and Historic Route 66, but not visible due to vegetation and topography. The pit is clearly visible from Forest Road 518, which is a major haul route as well between the pit and the Interstate. The proposed actions would continue operations in this pit without an expansion and therefore would not create additional scenic impacts. Current activity at the pit is consistent with the Moderate Scenic Integrity Designation.

Salmon Lake

This is a new proposed pit, 10.7 acres in size located within 0.5 miles from the General Crook Trail. It is located in an area with a Moderate SIO. It is unlikely that the pit would be visible from sections of the General Cook Trail.

Snafu

This is a proposed, new pit located 0.2 miles from County Road 3 (Lake Mary Road), which is a major travelway. While not a scenic byway, this road is a paved highway that goes through the heart of the Coconino National Forest. The Snafu pit is located on a hillside along Lake Mary Road that experienced a severe wildfire in 1996 called the Pot Fire. The fire killed most of the tree cover in this area, and while there has been some re-growth between the highway and the location of the proposed pit, is still generally sparse and made up of smaller trees. Due to the lack of tree screening, the pit would be clearly visible when driving adjacent to the pit on Lake Mary Road.

Snafu Pit would be located in an area with a “moderate” SIO objective. Scenic integrity in areas with a “moderate” SIO refers to landscapes where the valued landscape character appears slightly altered. Noticeable deviations must remain visually subordinate to the landscape character being viewed. Activity at the Snafu rock pit would not be consistent with SIO’s when viewed from foreground distances. This would result in a visual impact during the development and operation of the pit, which could occur over several years. Reclamation of the pit is expected to return the scenic integrity of the site within two years of reclamation efforts.

Willard Spring

This 8.5 acre existing pit has been a major material source for several decades. At its closest point the pit is located 0.06 miles from Interstate 17. The proposed 1.9 acre, or 22 percent, expansion would likely be visible from Interstate 17 as the pit is located on a slope visible just east of the interstate. However, the expansion is relatively small and there would be little deviation from the existing visual impact of the current 8.5 acre pit. Additionally, current activities and the proposed expansion are all located in an area of Moderate Scenic Integrity and the proposed activities are consistent with this designation.

Cumulative Effects

Cumulative actions including actions that may result in a scenic effect during the next 10 years were considered in areas within the Coconino and south Kaibab national forests. A list of these actions can be found in Table 7 of the Visual Resources Specialist Report. Specific focus was paid to actions or activities that would result in a cumulative impact due to overlapping spatial and temporal boundaries with a proposed pit site.

The Snafu Pit is located along County Road 3 (Lake Mary Road). Other activities occurring along this major travelway include road vegetation maintenance in 2012 and 2013, and the development of two scenic parking areas along Mormon Lake. Both of these actions are expected to be consistent with the valued landscape character and would not result in a cumulative impact. Should a major wildfire occur along Lake Mary Road

near the proposed Snafu Pit, there could be a cumulative impact to the landscape character by making the pit much more visible from surrounding high points. However, these impacts would likely be limited to the nearby Buck Mountain Lookout.

The Hostetter 2 Pit includes fairly limited cumulative effects. The proposed pit is currently at the location of a previously established borrow site that is less than an acre in size. Besides the nearby Hostetter tank, the dominant landscape feature is made up of young to intermediate aged ponderosa pine stands. A moderate to severe wildfire in this area could create a cumulative scenic impact by making the proposed pit location much more visible from surrounding areas, such as from along forest road 418 and from some of the cinder cone peaks located to the north, such as Deadman and O' Leary Peaks.

More generally, activities such as forest restoration often create a more "porous" landscape where there are fewer trees to screen pits and access roads from scenic impacts in landscapes. Almost a combined 500,000 acres, or slightly less than a quarter of the Coconino National Forest and South Kaibab, will receive some form of thinning or prescribed fire restoration treatment over the next 20 years. Some pits such as Salmon Lake, Youngs Canyon, and Big Ridge would be well outside areas receiving restoration treatments, but all of the other pit locations are located within 10 miles of where these treatments would occur. However, most of the proposed pits and expansions are located in the Moderate SIO designation, and therefore changes to the landscape from the combination of restoration treatments, wildfire and activities at the pits, would not be likely to result in a change in the valued landscape character because the pits are still located in areas where they are subordinate to the landscape character when viewed from major travelways or sensitive viewpoints.

3.4.2.4 Alternative C

Direct and Indirect Effects

Effects to visually sensitive areas and consistency with SIO's would be of the same type as described for the No Action and Proposed Action alternatives. As discussed for Alternative B - Proposed Action, proposed activities would result in some adverse impacts to SIOs. However, this alternative also proposes about 114 acres of reclamation work. Compared to the Proposed Action, there would be fewer adverse, temporary impacts to visually sensitive areas, and more long-term beneficial impacts.

Cumulative Effects

The cumulative effects from Alternative C would be similar to those for Alternative B - Proposed Action. However, the reclamation of existing pit proposed by this alternative would, in combination with forest restoration treatments, create a general cumulative impact of returning portions of the Forest to a more natural appearing landscape. This cumulative effect would take up to two decades after implementation to fully manifest.

3.5 WILDLIFE

3.5.1 EXISTING CONDITIONS FOR WILDLIFE

3.5.1.1 Habitat Conditions

The Project Area includes numerous potential natural vegetation types (PNVTs) that provide a variety of habitats for wildlife. PNVTs represent the potential plant community that could occupy the site under historic fire regimes (US Forest Service 2008a). The PNVTs found in the project area include:

Ponderosa pine

Pinyon-Juniper Types

Pinyon-juniper evergreen

Pinyon-juniper woodland

Pinyon-juniper grassland

Pinyon-juniper sagebrush

Montane subalpine grassland

Table 13 presents the total area of each PNVT for the new pits and pit expansion areas. A detailed description of these habitat types can be found in the Wildlife Specialist Report for the Rock Pits Environmental Assessment (JW Associates 2013f). Further details, including a breakdown by pit and pinyon-juniper subtypes can be found in the Wildlife Specialist Report for the Rock Pits Environmental Assessment.

There are no aquatic habitats within any of the proposed rock pit sites. However, ephemeral streams do occur near several of the pits. Any water bodies would be buffered by 100 feet.

Table 13. Potential Natural Vegetation Types for New Pits and Expansion Areas.

Potential Natural Vegetation Type	Area of New Pits and Pit Expansion by PNVT (acres)	Percent of Total New Pit and Pit Expansion Area in the PNVT
Ponderosa pine	178.3	77%
Pinyon-Juniper Grassland	11.0	5%
Pinyon-Juniper Evergreen	3.3	1%
Pinyon-Juniper Woodland	2.4	1%
Pinyon-Juniper Sagebrush	33.9	15%
Montane Subalpine Grassland	1.5	1%
Total	230.4	

3.5.1.2 Wildlife Species of Concern

The wildlife species discussed in this report are those that belong to one or more of the following groups:

1. Threatened, endangered species, candidate and sensitive species,
2. Migratory birds and,
3. Management indicator species.

Only those species who are known to occur or with a potential to occur or be affected by the proposed alternatives are analyzed. Excluded species are eliminated from further analysis by meeting one or both of the following conditions:

1. The species occurs in habitats that are not present; and/or
2. The Project Area is outside of the geographical or elevational range of the species.

Threatened, endangered or sensitive species that not known to occur or with no potential of occurring in the Rock Pits Project Area are documented along with rationale in the draft Biological Assessment and Evaluation for the Rock Pits EA, which is available upon request.

Threatened, Endangered, Candidate and Sensitive Species

The Threatened, Endangered & Sensitive (TES) Species Program is dedicated to conserve and recover plant and animal species that need special management attention and to restore National Forest and Grassland ecosystems and habitats. The TES program includes inventory and monitoring of species, habitat assessments, habitat improvements through vegetation treatments and structure installation, species reintroductions, development of conservation strategies, research, and information and education.

Table 14 lists those listed species that are known to occur, or with a potential to occur or be affected by the proposed alternatives (see above for conditions). The draft Rock Pits BAE provides the full list of all threatened and endangered species for the Coconino and Kaibab National Forests along with a rationale for those excluded from further analysis.

Table 14. Federal Threatened, Endangered, and Candidate Species and US Forest Service Sensitive Species Considered for Analysis⁹

Species	Status	Forest	Rationale
BIRDS			
Mexican spotted owl <i>Strix occidentalis lucida</i>	T, CH	CNF KNF	Occupies mixed conifer and ponderosa pine/gambel oak vegetation types, and has the potential to occur at some of the proposed rock pit sites. Several rock pit sites occur in critical habitat for the species.
California condor <i>Gymnogyps californianus</i>	E	CNF KNF	Nonessential experimental population on the Kaibab Forest. Nests on cliffs and forages over grasslands, oak savannas, mountain plateaus, ridges, and canyons. There is no suitable cliff nesting habitat in or near any of the proposed rock pit sites. However, suitable foraging habitat is present at some of the rock pit sites, and the species has the potential to occur.
Bald eagle <i>Haliaeetus leucocephalus</i>	T, S	CNF KNF	Primarily winter visitors to the Forests. There is one known nest sites on the Kaibab Forest, and there are two nesting pairs along the Verde River on the Coconino Forest. They occupy all habitat types and elevations and use tall trees, often near water. Species has the potential to occur during foraging activities at all proposed rock pit sites.
American peregrine falcon <i>Falco peregrinus anatum</i>	S	CNF KNF	There is no suitable cliff nesting habitat in or near any of the proposed rock pit sites. Most habitats may be used by peregrine falcons for foraging, as they prey upon bats, mammals, and birds. Species has the potential to occur during foraging activities at all proposed rock pit sites.
Northern goshawk <i>Accipiter gentilis</i>	S	CNF KNF	Occupies ponderosa pine, mixed conifer, and spruce-fir habitat types. All forested habitat above the Mogollon Rim is considered to be goshawk habitat. Since this habitat occurs at some of the proposed rock pit sites, the species has the potential to occur.
Ferruginous hawk <i>Buteo regalis</i>	S	CNF	Nests in a variety of habitat types, including grassland, shrub-grassland, pinyon-juniper woodland, and open shrublands. Known to nest on the Forest but are more commonly present during the winter. Avoids forested areas. Species has the potential to occur at some proposed rock pit sites.
Burrowing owl <i>Athene cunicularia</i>	S	CNF KNF	Dry, open, shortgrass, treeless plains, often associated with burrowing mammals. Species has the potential to occur at some of the proposed rock pit sites.
MAMMALS			
Merriam's shrew <i>Sorex merriami leucogenys</i>	S	CNF KNF	Inhabitant of cool, grassy places and near coniferous forests, including pinyon-juniper and ponderosa pine. Species could occur at most of the proposed rock pit sites.

⁹ E = Federal Endangered; T = Federal Threatened; CH = Designated Critical Habitat; C = Candidate Species; S = Forest Service Region 3 sensitive species.

Table 14. Federal Threatened, Endangered, and Candidate Species and US Forest Service Sensitive Species Considered for Analysis⁹

Species	Status	Forest	Rationale
Spotted bat <i>Euderma maculatum</i>	S	CNF KNF	Prominent rock features are required for roosting. These features are not in or near any proposed rock pit sites. However, species occurs across a range of elevations and habitat types and has the potential to occur at all of the proposed rock pit sites.
Allen's lappet-browed bat <i>Idionycteris phyllotis</i>	S	CNF KNF	Found in a variety of habitats, including riparian, woodlands, forests, and desert scrub. Species could occur at all of the proposed rock pit sites.
Pale Townsend's big-eared bat <i>Corynorhinus townsendii pallascens</i>	S	CNF KNF	Wide-ranging bat that roosts in caves, mines, and other man-made structures. While roosting habitat is not present in or near the proposed rock pit sites, the species could use the habitats for foraging. Species could occur at all proposed rock pit sites.
Greater western mastiff bat <i>Eumops perotis californicus</i>	S	CNF	Roost in cracks and crevices along high cliff ledges in rugged canyons. Species uses multiple habitat types for foraging and could occur at all proposed rock pit sites.
Dwarf shrew <i>Sorex nanus</i>	S	CNF KNF	Found in various habitats, including rocky areas in coniferous forest, meadows, pinyon-juniper woodland, and grasslands. Species could occur at most proposed rock pit sites.
Kaibab squirrel <i>Sciurus aberti kaibabensis</i>	S	KNF	Species is only found on the North Kaibab RD in ponderosa pine habitat with interlocking canopies. Since ponderosa pine habitat is mapped at the proposed rock pit site on this RD (Big Ridge), the species could occur.
Navajo Mogollon vole <i>Microtus mogollonensis navaho</i>	S	KNF	Can be found in mixed conifer, montane subalpine grassland, pinyon-juniper, ponderosa pine, and spruce-fir habitats. Ground cover vegetation is necessary. The species could occur at most rock pit sites on the Kaibab Forest.
REPTILES AND AMPHIBIANS			
Reticulate Gila monster <i>Heloderma suspectum suspectum</i>	S	CNF	Occupied vegetation types include desert grassland, and Mohave and Sonoran desert scrub; less often oak or pine-oak woodland. Since these habitat types are present at some of the proposed rock pit sites, the species has the potential to occur.
FISH			
None likely to occur in Project Area			None of the TES or Candidate fish species for the Kaibab or Coconino National Forests are likely to occur in or near any of the proposed rock sites because none of the proposed rock pits are near perennial streams nor are located in aquatic habitat.
INVERTEBRATES			
None likely to occur in Project Area			None of the Threatened, Endangered, Candidate or Sensitive invertebrate species for the Kaibab or Coconino National Forests are likely to occur in or near any of the proposed rock sites because none of the proposed rock site locations are near perennial streams nor are located in aquatic habitat.

Designated Critical Habitat

Areas designated as critical habitat are areas that may require special management considerations and are essential for the conservation of a species (US Fish & Wildlife Service 2004). Six of the proposed rock pit sites are within Mexican Spotted Owl (MSO) critical habitat. These sites are assumed to be suitable for the purposes of this analysis.

Federally Listed Threatened and Endangered Species

Two species from Table 14 are federally listed as Threatened or Endangered Species. The Mexican spotted owl (*Strix occidentalis lucida*) is a threatened species found on both the Coconino and Kaibab National Forests. Designated critical habitat also occurs in or near the project area for this species. The California condor (*Gymnogyps californianus*), is an endangered species and is also has the potential to be found on both the Coconino and Kaibab National Forests.

The information provided her is a summary of the information available about these species and their potential for occurrence in the project area from the draft Biological Assessment and Evaluation for the Rock Pits Environmental Assessment, available upon request. Refer to that document for more detailed information.

Mexican Spotted Owl (Strix occidentalis lucida)

On the Coconino and Kaibab National Forests, the Mexican spotted owl (MSO) occupies mixed conifer and ponderosa pine/gambel oak vegetation types, usually characterized by high canopy closure, high stem density, multi-layered canopies within the stand, numerous snags, and downed woody material.

Mexican spotted owls are nocturnal predators that feed primarily on small mammals. They are “perch and pounce” predators that locate prey from an elevated perch by sight or sound, then pounce on the prey and capture it with their talons. They commonly eat small and medium-sized rodents such as woodrats, peromyscid mice, and microtine voles. They also eat bats, birds, reptiles, and arthropods (US Forest Service 2009a).

All areas within ½ mile of MSO potential habitat (meaning critical or restricted habitat) would be surveyed the year of implementation or one year prior to implementation to determine whether any new areas have become occupied by owls.

MSO Protected Habitat and guidelines for that habitat are intended to protect all occupied nesting and roosting habitat areas, as well as all unoccupied steep slopes and reserved lands (US Fish & Wildlife Service 1995 and 2012). The Thomas 2 rock pit site is within the vicinity of MSO protected habitat, though none occurs within the area proposed for disturbance.

Within the critical habitat boundaries, critical habitat includes protected and restricted habitats as defined in the original Mexican Spotted Owl Recovery Plan, completed in 1995. Critical habitat is designated by the USFWS to provide for the survival and recovery of listed species. The USFWS identified physical and biological features (primary constituent elements) that are essential to the conservation of MSO in both canyon and forested areas (US Forest Service 2009a) in order to determine which areas to propose as critical

habitat. Federal actions within critical habitat boundaries may trigger Endangered Species Act Section 7 consultation with the USFWS if actions may affect the species or protected or restricted habitat, and at least one of the primary constituent elements (US Forest Service 2009a). Primary constituent elements were identified in the 1995 Recovery Plan and include:

1. Primary Constituent Elements Related to Forest Structure:
 - A range of tree species, including mixed-conifer, pine-oak, and riparian forest types, composed of different tree sizes reflecting different ages of trees, 30-45% of which are large trees with a trunk diameter of ≥ 0.3 m (12 in) when measured at 1.4 m (4.5 ft) from the ground;
 - A shaded canopy created by the tree branches and foliage covering $\geq 40\%$ of the ground; and,
 - Large, dead trees (i.e., snags) with a trunk diameter of at least 0.3 m (12 in) when measured at 1.4 m (4.5 ft) from the ground.
2. Primary Constituent Elements Related to Maintenance of Adequate Prey Species:
 - High volumes of fallen trees and other woody debris;
 - A wide range of tree and plant species, including hardwoods; and,
 - Adequate levels of residual plant cover to maintain fruits, seeds, and allow plant regeneration.
3. Primary Constituent Elements Related to Canyon Habitat (one or more of the following):
 - Presence of water (often providing cooler air temperature and often higher humidity than the surrounding areas);
 - Clumps or stringers of mixed-conifer, pine-oak, pinyon-juniper, and/or riparian vegetation;
 - Canyon walls containing crevices, ledges, or caves; and,
 - High percentage of ground litter and woody debris.

Recovery habitat, as defined in the 2012 Recovery Plan (referred to as 'restricted habitat' in the 1995 MSO Recovery Plan), refers to potential nesting and roosting habitat in unoccupied areas. Recovery habitat areas include ponderosa pine, Gambel oak and mixed-conifer forests, and riparian environments. All of the Ruin site is within MSO recovery habitat, and the Willard site is in the vicinity of restricted habitat.

According to the 2012 MSO Recovery Plan, "managers should identify and protect stands that meet or exceed nest/roost conditions and then assess whether or not these stands satisfy the area requirements in Table C.3. If these stands are not sufficient to meet the area requirements in Table C.3, managers should identify those stands in the planning area that come closest to meeting nest/roost conditions and manage those stands to develop nest/roost conditions as rapidly as reasonably possible to meet recommended percentages"

The process of identifying stands that come closest to meeting nest/roost conditions has been completed through landscape-level planning and incorporation of monitoring via the Four Forest Restoration Initiative.

One initially proposed site was identified (i.e. Thomas pit) as having potential nest/roost conditions and was re-located to an area without observed primary constituent elements.

Proposed rock pit sites within MSO critical habitat are not expected to include nest/roost conditions and include all or portions of Cinch Hook, Davenport, Deadhorse, Lockwood, Macks, Ruin, Snafu and Thomas 2.

California Condor (*Gymnogyps californianus*)

The California condor is a long-lived species with low reproductive rates, laying one egg every other year or two. Condors nest in various types of rock formations including crevices, overhung ledges, potholes, caves, or in tree cavities. In Arizona, condors nest and roost in steep terrain with cliffs, ledges, and caves (AZGFD 2006). Cliffs, tall conifers, and snags are generally used as roost sites, which also provide strong updrafts required for lift into flight. Condors are opportunistic foragers, feeding only on carcasses. Most condors forage in open terrain and can travel 100 miles or more per day (US Forest Service 2011b).

The last known sighting of a wild condor in Arizona was near Williams in 1924 (Phillips et al. 1964). The last wild condor was captured in 1987. Reintroduction of captive-bred condors in Arizona began in 1996 at the Vermilion Cliffs National Monument Release Site. Condors were reintroduced under Section 10(j) of the Endangered Species Act as an experimental nonessential population (US Fish & Wildlife Service 1996). The Arizona condor population is at 74 as of March 2011 (AZGFD 2011).

Since reintroduction, there have been several reports of condors on the Coconino and Kaibab National Forests. Several years ago, one condor was reported north of Flagstaff, and another condor roosted one night near Sedona, Arizona as it made a large loop back north (Parrish 2008). There have been no recorded occurrences of California condor at any of the rock pit sites, although suitable foraging habitat is present in most of the rock pit sites.

Bald Eagle (*Haliaeetus leucocephalus*)

Bald eagles in central Arizona prefer to nest on cliff ledges or pinnacles or in tall trees (US Fish & Wildlife Service 1982). They mainly forage on waterfowl and fish found along major streams; however, they do hunt in the uplands and forage on various mammal species, especially in the winter. There are six nesting pairs of bald eagles on the Coconino National Forest (US Forest Service 2009a), and one the Kaibab National Forest. The closest nest is reported to be at the Walnut Canyon National Monument approximately 2 miles from the Youngs Canyon pit and there is also a nest 4.9 miles to the proposed Thomas 2 rock pit site.

There is one bald eagle breeding area (BA) near Lower Lake Mary. Breeding bald eagles at this BA are protected by a seasonal closure that restricts all entry during the breeding season and is monitored by nest watchers some years (Arizona Game and Fish Department Nest Watch program) (US Forest Service 2009a).

Bald eagles on the Coconino and the Kaibab National Forest are primarily winter and/or migratory visitors. They are most frequently seen in ponderosa pine, pinyon-juniper, and grassland habitats, often near large water sources (US Forest Service 2009a). The Forests provide important wintering habitat for Arizona eagles. On average, approximately 16 percent of all wintering eagles counted in Arizona during the midwinter survey are found within the Coconino National Forest boundaries and in some years, the percentage is as high as 26

percent (Coconino National Forest midwinter survey files). The highest numbers of wintering eagles are counted on routes that include Lake Mary, Mormon Lake, and I-17. Wintering eagles arrive in the fall, usually late October or early November, and leave in early to mid April. Populations peak in February and March.

On the Forest, small to moderate-sized groups (typically 2 to 48) of bald eagles roost at night in clumps of large trees in protected locations such as drainages and hillsides (Grubb and Kennedy 1982, Dargan 1991). Roost trees are large live or dead ponderosa pine trees averaging 28 inches dbh (diameter at breast height) that occur in groups and are much larger than other trees in roost stands (US Forest Service 2009a).

No bald eagle winter roost sites are located in or near the proposed rock pit sites. Since the species occupies all habitat types, it has the potential to occur at all rock pit sites.

Forest Sensitive Species

American Peregrine Falcon (*Falco peregrinus anatum*)

Peregrine falcons are found on every continent except Antarctica. The subspecies *F. p. anatum* nests from central Alaska, throughout western Canada, the western U.S., and south to central Mexico. The wintering range of American peregrine falcon includes North America to Central and South America, as far south as Chile. Within Arizona, the species breeds wherever sufficient prey is available near cliffs. Optimum peregrine falcon habitat is generally considered to be steep, sheer cliffs overlooking woodlands, riparian areas, or other habitats supporting avian prey species in abundance. There have been no recorded occurrences of peregrine falcons at any of the rock pit sites, although suitable foraging habitat is present in all the rock pit sites.

A population decline in the 1950s and 1960s due to DDT contamination has apparently been reversed. In addition to being found in greater numbers, Arizona's peregrines are being found in areas that would have formerly been considered marginal, suggesting that populations may have reached levels saturating the optimal habitat available, and new breeding pairs are forced to breed in sub-optimal areas (AZGFD 2011).

Northern Goshawk (*Accipiter gentilis*)

The northern goshawk occupies ponderosa pine, mixed conifer, and spruce-fir forest types in the Southwest. The goshawk is a forest habitat generalist that uses a wide variety of forest stages. It prefers stands of intermediate canopy cover for nesting, while more open areas are used for foraging. All forested (ponderosa pine, mixed conifer and spruce-fir) habitat above the Mogollon Rim is considered to be goshawk habitat, including any associated pine or mixed conifer stringers that may extend below the rim. The goshawk preys on large- to medium-sized birds and mammals, which it captures on the ground. On the Coconino Forest, the northern goshawk occurs on all Districts except the Sedona District (US Forest Service 2009a). On the Kaibab Forest, the goshawk occurs on all Districts.

There are 65 goshawk post fledgling family areas (PFAs) on the Coconino National Forest, with an additional 2 PFAs that are shared with other Forests (US Forest Service 2009a). There are 43 full or partial goshawk PFAs on the Kaibab National Forest.

The Forest Plans provides guidelines for human disturbance, including limiting human activities in or near nest sites and post fledgling family area's during the breeding season so that goshawk reproductive success is

not affected by human activities. There are no rock pit sites in any northern goshawk PFAs. Potential habitat occurs at the rock pit sites with ponderosa pine vegetation (Table 5), and the Lockwood site has been identified as having suitable goshawk habitat.

Ferruginous Hawk (Buteo regalis)

Ferruginous hawks are primarily found in the western states of North America, southern Canada, and into central Mexico. Within Arizona, the species breeds in northern Arizona on the Colorado Plateau. From September to April, ferruginous hawks can be seen in virtually any part of Arizona with open environments, particularly in agricultural fields and native grasslands. The species occurs in grasslands, sagebrush (*Artemisia* spp.), saltbush (*Atriplex* spp.), greasewood (*Sarcobatus vermiculatus*) shrublands, and the periphery of western pinyon-juniper and other forests (AZGFD 2011). There have been no recorded occurrences of ferruginous hawk at any of the rock pit sites, although suitable habitat is present at all the sites.

Burrowing Owl (Athene cunicularia hypugaea)

Burrowing owls are found in flat, open, low-stature grasslands, sparsely vegetated desertshrub, and edges of human disturbed land. These owls take over burrows of prairie dogs and ground squirrels, and dens of coyote, fox and badger. They are also known to use artificial burrows. Burrowing owls also need perches, such as mounds and fence posts. They primarily eat insects and small mammals but are known to take other small-sized species. Similar to prairie dogs, burrowing owls are associated with the Great Basin/Colorado Plateau grassland and steppe, montane subalpine, and semi-desert grasslands (US Forest Service 2009a). There have been no recorded occurrences of burrowing owl at any of the rock pit sites, although suitable habitat is present in the rock pit sites that have grassland vegetation (Table 5).

Merriam's Shrew (Sorex merriami leucogengys)

This shrew is distributed throughout the West and is associated with multiple habitat types. Hoffmeister (1986) shows distribution for the species along the Mogollon Rim. Habitat for this insectivorous shrew includes herbaceous ground cover, moist soils, logs and coarse woody debris, and proximity to water. They inhabit cool, grassy places near coniferous forests, dry places often near water but not along streams. This shrew inhabits grassland interspersed or associated with water and wetland cienegas, as well as montane subalpine and Great Basin/Colorado Plateau grassland and steppe habitats (US Forest Service 2009a). There have been no recorded occurrences of Merriam's shrew at any of the rock pit sites, although suitable habitat is present in the rock pit sites with grassland and ponderosa pine habitat (Table 5).

Spotted Bat (Euderma maculatum)

Historic records suggest that the spotted bat was widely distributed but quite rare over its range, although it may have been locally abundant at certain sites. The historic range of the spotted bat includes Arizona, California, Colorado, Idaho, Montana, New Mexico, Nevada, Oregon, Utah, Wyoming, Texas, Canada, and Mexico. Roost site characteristics are poorly known for this species, but limited observations suggest that spotted bats roost singly in crevices, with rocky cliffs and surface water characteristic of localities where they occur. It has been found in conifer forests in northern Arizona (Kaibab Plateau) and other western states. There are no roost locations known to occur on the Coconino or Kaibab Forests. This species is a habitat

generalist and could forage across both the Kaibab and Coconino Forests (US Forest Service 2009a). There have been no recorded occurrences of spotted bat at any of the rock pit sites, and suitable roosting habitat is not present. However, suitable foraging habitat is present at all the rock pit sites.

Allen's Lappet-Browed Bat (*Idionycteris phyllotis*)

Allen's lappet-browed bats have been found in a variety of habitats in Arizona, including ponderosa pine, pinyon-juniper, Mexican woodland, white fir forests, and Mohave desertscrub. They are often associated with water, whether for feeding or drinking, or both, is unclear. The species' preferred habitat includes areas with the presence and regeneration of snags and/or dead and dying trees with loose bark, dispersion of habitat types and structure within habitat including openings, montane meadows, or openings with wet soils with diverse vegetative herbaceous ground cover, and species composition to support prey items. Pools, tanks, and openings with wet ground also support prey (US Forest Service 2009a).

In 2007, a bat roost inventory and monitoring project compiled, located, and inventoried bat roosts in Arizona Game and Fish Region 2 and identified current and potential threats and management needs (Solvesky and Chambers 2007). An Allen's lappet-browed bat maternity roost was documented in a basalt shelter cave, and several ephemeral tree/snag roosts were located on the Coconino Forest. There have been no recorded occurrences of Allen's lappet-browed bat at any of the rock pit sites, although suitable habitat is present at all the rock pit sites.

Pale Townsend's Big-Eared Bat (*Corynorhinus townsendii pallescens*)

The pale Townsend's big-eared bat is found statewide and throughout the western US and south into Mexico. Habitat includes caves, mines, lava tubes, and abandoned buildings. The population is apparently secure although is thought to be declining due to loss of habitat in caves and mines. The species' preferred habitat is ponderosa pine with presence and regeneration of large snags and/or dead and dying trees with loose bark, cavity-forming rock, openings and meadows within ponderosa pine, mixed-conifer and pinyon juniper with diverse vegetative herbaceous ground cover, and species composition to support prey items.

A 2007 bat roost inventory and monitoring project compiled, located, and inventoried bat roosts in Arizona Game and Fish Region 2, including all of the Coconino and Kaibab National Forests, and identified current and potential threats and management needs (Solvesky and Chambers 2007). Possible maternity roosts were documented on the Forests. There have been no recorded occurrences of pale Townsend's big-eared bat at any of the rock pit sites, and suitable roosting habitat is not present. However, suitable foraging habitat is present at all of the rock pit sites.

Greater Western Mastiff Bat (*Eumops perotis californicus*)

Range for this bat includes all Arizona counties except Yavapai, Navajo, Apache, and Santa Cruz. There is one specimen collected after death near Flagstaff in 1992. They are documented to be located mostly on the North Kaibab in Arizona. Physical habitat is cliffs, canyons, and crevices at an elevation range of 240 to 8,475 feet. Population information is unknown but is suspected to be in decline. The species prefers forest habitat diversity, ponderosa pine with presence and regeneration of snags and/or dead and dying trees with loose bark, dispersion of habitat types and structure within habitat including openings, montane meadows, or openings

with wet soils with diverse vegetative herbaceous ground cover, and species composition to support prey items. Pools, tanks, and openings with wet ground also support prey. There are no roost locations known to occur on the Forests. Greater western mastiff bats are habitat generalists and use multiple habitats for foraging (US Forest Service 2009a). There have been no recorded occurrences of greater western mastiff bat at any of the rock pit sites, and suitable roosting habitat is not present. However, suitable foraging habitat is present at all of the rock pit sites.

Dwarf Shrew (Sorex nanus)

This species has a limited range and is known to occur on the Kaibab Plateau, San Francisco Peaks, and White Mountains (Hoffmeister 1986). Little is known about this insectivorous animal and its population status. Habitat includes rocky areas, talus slopes with fallen logs in alpine tundra into subalpine coniferous forest, and herbaceous wetlands. They can also be found in ponderosa pine and pinyon-juniper with a dispersion of vertical and horizontal structure, logs, and openings, including meadows with well-developed herbaceous understory and wet ground (US Forest Service 2009a). There have been no recorded occurrences of dwarf shrew at any of the rock pit sites, although suitable habitat is present at all rock pit sites.

Kaibab Squirrel (Sciurus aberti kaibabensis)

The Kaibab squirrel is a geographically isolated subspecies of the Abert's squirrel and an obligate resident of ponderosa pine forests. It is both a forest sensitive and a Management Indicator Species (MIS) for early seral stage ponderosa pine. However, Abert's squirrels use a variety of age classes, and research from several locations has shown strong habitat associations with mature ponderosa pine. Recent research indicates that this species' best habitat is the intermediate to older aged forest (trees 9 to 22 inches diameter at breast height [dbh]), where groups of trees have crowns that are interlocking or in close proximity (Dodd et al. 1998). The species occurs on the Kaibab Plateau, within the North Kaibab Ranger District but Forest-wide population trend is inconclusive since there is little Forest-specific data. Statewide information indicates a stable trend for hunter harvest of squirrels.

Only the Big Ridge rock pit site is in the range of the Kaibab Squirrel. Although there have been no recorded occurrences, suitable habitat is present at the site.

Navajo Mogollon Vole (Microtus mogollenensis navaho)

Hoffmeister (1986) has delineated the range for this vole from Navajo Mountain southward to the western part of the Mogollon Plateau from near Mormon Lake westward to the vicinity of Williams. They rely on grasses and other herbaceous vegetation for food and cover. When inactive they occupy nests in clumps of vegetation, under logs, or in depressions on or under the ground. Navajo Mogollon voles can be found in mixed conifer, montane subalpine grassland, pinyon-juniper woodland, ponderosa pine, and spruce fir vegetation (US Forest Service 2009a). There have been no recorded occurrences of Navajo Mogollon vole at any of the rock pit sites, although suitable habitat is present in those rock pit sites with conifer forest vegetation (Table 5).

Reticulate Gila Monster (Heloderma suspectum suspectum)

The Gila monster is known to occur throughout the Verde Valley except for Sedona and the immediate surrounding red rock country. They are known to occur in shrubby, grassy, and succulent desert, and

occasionally occur in oak woodland and canyon bottoms or arroyos with permanent or intermittent streams. They use rocky bajadas, hillsides, mountainous terrain with rocky shelters, and foothills. There is little population information for this species, but the consensus is that the Gila monster is less abundant and less widespread now than it was formerly (US Forest Service 2009a). There have been no recorded occurrences of reticulate Gila monster at any of the rock pit sites, although suitable habitat is present at the rock pit sites with grassland, desertscrub, and oak/pine-oak woodland (Table 5).

Western red bat (*Lasiurus blossevillii*)

In Arizona, the western red bat is thought to be a summer resident only. It occurs statewide, except in desert areas, but primarily along riparian corridors among oaks, sycamores, and cottonwoods at elevations between 2,400 and 7,200 feet. Red bats typically roost in dense clumps of foliage in riparian or other wooded areas but forage in adjacent uplands. This species has been documented on the Coconino National Forest, roosting in Gambel oak. Gambel oak can be a common component in ponderosa pine forests.

Management Indicator Species

Management Indicator Species (MIS) are used as an indicator of habitat quality, to track effects of management on the habitat and to predict future conditions. The MIS concept was adopted by the US Forest Service to serve as a barometer for species viability at the Forest level. They are generally selected as the species whose habitat requirements most reflect those of the habitat of concern and who can act as monitors to elucidate the effects of resource management on population recovery, maintenance of population viability, or ecosystem diversity. MIS species serve many functions in forest planning including focusing management direction developed for project alternatives, provide a means to analyze the effects of alternatives on wildlife and biological diversity, and serve as a reliable feedback mechanism during forest plan implementation.

MIS are elected from one of five categories as mandated in the National Forest Management Act and the 1982 Rule (36 FR219.19(a)(1)). These categories are as follows:

- TES Species from State and Federal lists;
- Species commonly hunted, fished or trapped;
- Non-game species of special interest;
- Species with special habitat needs that may be influenced significantly by planned management programs;
- Additional plant or animal species selected because their population changes are believed to indicate the effects of management activities on other species of selected major biological communities or on water quality.

Forest-wide assessments have been completed to summarize current knowledge of population and habitat trends for MIS on the Kaibab and Coconino Forests in 2010 and 2013, respectively (US Forest Service 2012, US Forest Service 2013). This report tiers to and summarizes species habitat and population trends from the status reports. In addition, AGFD annual survey results provide information on animals managed as big game species. Table 15 lists the MIS that are likely to occur in the project area along with their habitat needs and

occurrence information. The draft Wildlife Specialist Report for the Rock Pits Environmental Assessment (available upon request) contains a full list of MIS for the Kaibab and Coconino National Forests along with rationale for those species who are not analyzed further in this document.

Table 15. MIS Species with Potential to Occur in the Project Area.

MIS Species	PNVT Habitat	Indicator habitat	Rationale
Kaibab Squirrel <i>Sciurus aberti kaibabensis</i>	Ponderosa Pine	Early seral ponderosa pine	Species is only found on the North Kaibab RD in ponderosa pine habitat with interlocking canopies. The species could occur at the Big Ridge site, which is located in ponderosa pine habitat.
Northern Goshawk <i>Accipiter gentilis</i>	Ponderosa Pine	Late seral ponderosa pine	Occupies ponderosa pine, mixed conifer, and spruce-fir habitat types. All forested habitat above the Mogollon Rim is considered to be goshawk habitat. Since this habitat occurs at some of the proposed rock pit sites, the species has the potential to occur.
Pygmy nuthatch <i>Sitta pygmaea</i>	Ponderosa Pine	Late seral ponderosa pine	Pygmy nuthatch is a generalist found in late seral ponderosa pine habitat with snags. Suitable habitat is present at proposed rock pits on ponderosa pine habitat in the planning area.
Turkey <i>Meleagris gallopavo</i>	Ponderosa Pine	Late seral ponderosa pine	Turkey habitat requires late seral ponderosa pine with cover. Suitable habitat is present at proposed rock pits on ponderosa pine habitat in the planning area.
Mexican Spotted Owl <i>Strix occidentalis lucida</i>	Ponderosa Pine Mixed conifer Spruce-fir	Late seral mixed conifer and spruce fir	Occupies mixed conifer and ponderosa pine/gambel oak vegetation types, and several rock pit sites occur in potential foraging habitat or restricted habitat.
Elk <i>Cervus elaphus</i>	Ponderosa Pine Mixed Conifer Spruce-fir	Early seral ponderosa pine, mixed conifer and spruce fir	Elk is a generalist found in early seral habitat, including ponderosa pine. Suitable habitat is present at proposed rock pits on ponderosa pine habitat in the planning area.
Hairy woodpecker <i>Picoides villosus</i>	Ponderosa Pine Mixed Conifer Spruce-fir	Snag component of ponderosa pine, mixed conifer, and spruce-fir	Hairy woodpeckers are dependent on snags in conifer forest. Suitable habitat is present at proposed rock pits on ponderosa pine habitat in the planning area.
Red-naped sapsucker <i>Sphyrapicus nuchalis</i>	Ponderosa Pine Mixed Conifer Spruce-fir	Late seral Aspen indicator	A transient and winter visitor of central Arizona, found in mixed conifer forests. It is a primary cavity nester that excavates nest holes in snags or living trees with a dead or rotten interior. In Arizona, they show a strong preference for aspen. Aspen is not a separate PNVT and may be contained in mixed conifer as well as ponderosa pine in the proposed rock pit sites.
Juniper titmouse <i>Baeolophus ridgwayi</i>	Pinyon-juniper evergreen shrub Pinyon-juniper woodland	Late seral and snag component of pinyon-juniper	Juniper titmouse is a pinyon-juniper obligate species. Suitable habitat is present at proposed rock pits on pinyon-juniper habitat in the planning area.
Mule deer <i>Odocoileus hemionus</i>	Pinyon-juniper evergreen shrub Pinyon-juniper Woodland	Early seral aspen pinyon juniper	A generalist found in early seral habitat, including for aspen and pinyon-juniper. Suitable habitat is present at proposed rock pits on pinyon-juniper habitat in the planning area.

MIS Species	PNVT Habitat	Indicator habitat	Rationale
Pronghorn antelope <i>Antilocapra americana</i>	Semi-desert grasslands Great Basin grasslands Montane Subalpine grassland	Early and late seral grassland	Pronghorn require grasslands and open areas. Suitable habitat is present at proposed rock pits on grassland habitat in the planning area.

Kaibab Squirrel (Sciurus aberti)

The Forest Plan designates the Abert's squirrel as a MIS for early seral stage ponderosa pine forests. It is also listed as a Forest-Sensitive Species. The discussion for this species is found above under the discussion of Forest Sensitive Wildlife Species.

Northern Goshawk (Accipiter gentilis)

The Forest Plans designates this species a MIS for late seral stages of ponderosa pine forests. It is also listed as a Forest-sensitive species. Northern goshawk are an indicator for late seral ponderosa pine forest. The trend for late seral ponderosa pine forest is increasing slightly. The Coconino National Forest MIS report identified that the population trend for this species is stable to declining. New territories are still being found on the Forest, but occupancy rates may be declining these results may also be affected by a lower level of monitoring that has occurred in the last decade. More discussion for this species is found above under the discussion of Forest Sensitive Wildlife Species.

Pygmy nuthatch (Sitta pygmaea)

Pygmy nuthatches were selected as an indicator for late-seral ponderosa pine habitat. They are primary and secondary cavity nesters and dead or rotted wood in snags is an important habitat component. In northern Arizona, they breed and feed in ponderosa pine and also in shallow ravines that contain white fir, Douglas-fir, Arizona white pine, quaking aspen, and an understory of maple (Kingery and Ghalambor 2001).

The pygmy nuthatch is regarded as one of the best indicator species for overall health of bird communities in ponderosa forests (Szaro and Balda 1982) because negative changes in its population status within managed ponderosa pine forests may reflect adverse changes in the community as a whole. Management strategies that move ponderosa pine forests closer to the historic range of variation should positively affect the pygmy nuthatch. Applying protective measures for goshawk to direct management practices should positively affect this species, as this prescription results in forest structure that more closely resembles historic forest conditions than those present today.

Populations of the pygmy nuthatch appeared to crash based on Forest monitoring efforts in 1997, but have been slightly increasing since that date. The pygmy nuthatch populations are thought to be stable to slightly declining on the Coconino and Kaibab National Forests and statewide. In areas that were treated with thinning and prescribed burns or that have been thinned and then burned naturally, pygmy nuthatches are likely stable to increasing. Dramatic population fluctuations in the short term are not unusual, and small, local populations, such as those in snowmelt drainages, may be temporarily extirpated. As forest succession

increases, snag numbers are increasing but are likely to remain below levels recommended in forest plan guidelines.

Turkey (Meleagris gallopavo)

The Forest Plan designates turkey as a MIS for late seral stage ponderosa pine forests, based on roost habitat requirements. Turkey roosts and nesting habitat occur in steep drainages and on hills. Currently, wild turkeys occur throughout most of the state's forested regions, including the Kaibab Plateau.

Wild turkey populations have been in a general decline in Arizona since 1969 (AZDFG 2010). Turkeys were detected during surveys conducted by Rocky Mountain Biological Observatory (RMBO). They may be present in sufficient numbers, but detection is difficult because of their secretive behavior (US Forest Service 2010a). Factors affecting turkey populations are loss of mature forests, lack of cover in key areas (including travel corridors), water availability, and forage availability (US Forest Service 2002). Based on AGFD and Breeding Bird Survey (BBS) data, it appears that turkey populations on the Kaibab National Forest have a variable but overall increasing trend. In the Coconino National Forest, an overall stable population trend is seen based on available data (US Forest Service 2013).

Mexican Spotted Owl (Strix occidentalis lucida)

Mexican spotted owl has been identified as an indicator for late seral mixed conifer habitat. Overall, the Forestwide population trend for the Mexican spotted owl is not known for certain, but may be stable to declining for the Coconino and declining on the Kaibab. A few new PACs are still being found on the Forest, and occupancy rates are up and down. The only demography study done on the Forest found that the owls within the study area were declining at a rate of >10% per year from 1991-1997. More recent data shows fewer occupied PACs, but this may be a result of a decreased survey intensity. The Mexican spotted owl is also listed as a Forest-Sensitive Species and the discussion for Mexican spotted owl can be found above under Forest Sensitive Species.

Elk (Cervus elaphus)

Elk is an indicator of early seral stages of ponderosa pine, mixed conifer, and spruce-fir forests. In addition to occupying pine forests, they graze grassland and woodland habitats occurring within the forest. They occupy mountain meadows and forests in summer and move to lower-elevation pinyon-juniper woodland, conifer forest, and grasslands in winter where they will browse woody shrubs (Hoffmeister 1986). Overall, elk are considered to be stable statewide (AGFD 2011) and stable to increasing on the Coconino and Kaibab National Forests (US Forest Service 2013). According to AGFD, mule deer numbers have been cyclic, responding mainly to climatic events. Drought conditions in recent years have resulted in low fawn survival (US Forest Service 2010a). Data compiled by AGFD for the Game Management Units (GMUs) on and around the Kaibab National Forest show an increase in elk numbers from the late 1980s into the mid to late 1990s (US Forest Service 2010b).

Hairy woodpecker (Picoides villosus)

This species is an indicator of snags in ponderosa pine, mixed conifer, and spruce-fir forests for suitable nesting and feeding habitat. Hairy woodpeckers are most abundant in mature forests with large old trees suitable for cavity nesting and are also common in medium-aged forests. They are strongly associated with

burned areas, an important historical component of northern Arizona's forests resulting from a frequent fire interval (Covington et al. 1997). Although they may forage in burned areas, they prefer forests with dense canopies (Bushman and Therres 1988). This species is experiencing loss of suitable breeding habitat in the form of snags, both range-wide and in Arizona. The Forest-wide trend is stable, or slightly increasing. Minor population decreases occur on a short-term scale of 1 to 3 years but are generally followed by a recovery (US Forest Service 2013). Forest Service guidance for snag retention and vegetation projects to return project area to historical conditions are likely to benefit this species.

Red-naped sapsucker (Sphyrapicus nuchalis)

The red-naped sapsucker is a management indicator species for late seral stage and snag component for aspen. Larger stands of aspen are located primarily within the mixed conifer PNVT. A small proportion of aspen is found as small, localized patches within the ponderosa pine PNVT. The Forest-wide trend is declining this is likely related to the decline in aspen trees throughout the west and locally on in northern Arizona. Aspen is declining due to a lack of low-intensity wildfire, increased foraging by herbaceous ungulates such as elk, and competition from conifer species which replace aspen when there is a lack of disturbance.

Juniper titmouse (Baeolophus ridgwayi)

Juniper titmouse is an indicator of late seral and snag component of pinyon-juniper and is represented by the Pinyon-juniper Woodland and Pinyon-juniper Evergreen Shrub PNVTs. The titmouse is a pinyon-juniper obligate species and is most common where juniper is dominant and where large, mature trees are present to provide natural cavities for nesting (Cicero 2000). BBS trend data for Arizona indicate a slightly decreasing trend between 1996 and 2000. Christmas bird count data indicate a stable to slightly declining trend for wintering juniper titmice in northern Arizona in general. The Coconino MIS report shows juniper titmouse populations are stable on the forest, whereas the Kaibab National Forest MIS report found a decreasing trend for this species on the Forest.

Within the Colorado Plateau, changes in historic fire regimes and habitat conversion represent two major potential management impacts on the juniper titmouse. Current management practices encourage returning pinyon-juniper to its natural range of variation. Therefore, population trends on the Forests should continue to be surveyed while overall habitat restoration efforts continue.

Mule Deer (Odocoileus hemionus)

Mule deer is an indicator of early seral stages of aspen and pinyon-juniper woodlands. Mule deer are also an economically and socially important species. They are a generalist species that use ponderosa pine, mixed conifer, woodland, and chaparral habitats. The project area is considered summer range and fawning habitat for mule deer.

Mule deer occur across the forests but are especially important on the Kaibab Forest within the North Kaibab Ranger District (NKRd), much of which is within the boundaries of the Grand Canyon Game Preserve. Game Management Unit (GMU) for the South Zone display a stable to decreasing trend in mule deer numbers. GMUs 6B, 7, and 8 show decreasing to stable trends. This is consistent with mule deer numbers around Arizona. GMU 9 displays a variable but decreasing trend. Data from the North Kaibab Ranger District indicate an increasing trend since the early 1990s. In the Coconino Forest, mule deer populations

have been declining due to factors such as disease, poaching, climatic conditions, and habitat changes, resulting in a declining Forest-wide trend (US Forest Service 2013).

Pronghorn antelope (*Antilocapra americana*)

Pronghorn were selected as an MIS to represent species using early and late seral grassland habitats; however, they are also an economically and socially important species. Pronghorn are associated with grasslands and savannahs with scattered shrubs and rolling hills. Although the total amount of grassland habitat has generally remained stable, habitat quality is stable to declining due to tree encroachment, fire suppression, long-term climatic changes, short-term drought, and ungulate grazing.

Survey numbers from the AGFD indicate different trends for different herds. Overall, the forest-wide trend for Kaibab is decreasing and is stable on the Coconino. For the Coconino Forest, declining numbers of animals observed and fawn to doe ratios below a breakeven of 20 to 35 fawns per 100 does is documented for all Game Management Units (GMUs) on the Forest except GMU 7 (US Forest Service 2009a). This has changed in recent years with fawn:doe ratios increasing when looked at over the last decade. In the Kaibab Forest, there appears to be an increasing trend for pronghorn in GMU 8, located primarily on the Williams Ranger District. Pronghorn in GMU 6B have been in decline since the mid 1990s. Pronghorn numbers on GMU 7, north of I-40, indicate a slightly decreasing trend since the early to mid 1990s. GMU 9, also north of I-40, has demonstrated a relatively consistent increasing trend since 1985. Pronghorn numbers on the North Kaibab Ranger District (GMU 12A) appear to be sustaining an increasing trend, with animal counts consistently larger in recent years than they were in the late 1980s (AZDFG 2011).

In the project area, habitat may occur throughout suitable grassland habitat areas. The Youngs Canyon site is adjacent to mapped pronghorn antelope habitat.

Migratory Bird Species of Concern

The US Forest Service plays a pivotal role in conservation of migratory bird populations and their habitats. The Forest Service supports and participates in the North American Bird Conservation Initiative and Partners in Flight, both nationally and regionally. Many National Forests and Grasslands are nationally and internationally recognized as Important Bird Areas or other migratory bird designations. Within the US National Forest system, conservation of migratory birds focuses on providing a diversity of habitat conditions at multiple spatial scales, ensuring that bird conservation is addressed when planning for other land management activities. District and Forest wildlife biologists frequently incorporate recommendations from comprehensive planning efforts when addressing the effects of proposed actions on migratory bird populations (US Forest Service and US Fish & Wildlife Service 2008).

The APIF Plan and the Birds of Conservation Concern identify priority species of concern. Birds from these lists have been categorized by habitat type (US Forest Service 2012). In general, birds within the pinyon-juniper woodland, ponderosa pine forest, aspen, and high-elevation grassland habitat types have the potential to occur in the project area, while birds within riparian habitats, mixed conifer forest, subalpine spruce-fir, cave/cliff habitats, and cold-desert shrub habitat are not likely to occur due to an absence of these habitat types in the planning area. Table 16 displays migratory birds that may occur in the Project Area by Habitat

Type. A more complete and detailed listing of these birds, their habitat requirements and species specific needs can be found in the Wildlife Specialist Report for the Rock Pits Environmental Assessment, which is available upon request.

The discussion of migratory birds in this document focuses on availability of specific habitat types. These include ponderosa pine, pinyon-juniper and high elevation grasslands. These habitats and their distribution in the project area are discussed below

Ponderosa Pine Habitat Types

The ponderosa pine cover type covers 35 percent of the Coconino and Kaibab National Forests. This vegetation type is found primarily from 6,000 to 8,000 feet in elevation but is found as low as 5,500 feet on north slopes and as high as 9,000 feet on south facing slopes. While ponderosa pine is the primary tree species on these sites other common tree species may include gambel oak, Douglas fir, and white fir. The ponderosa pine PNVT covers a substantial part of the assessment area, including approximately 76 percent of the area proposed for new pits or expansion areas.

Pinyon-juniper Habitat Types

Pinyon-juniper habitat types are some of the most common within the assessment area and the most common cover type across the two Forests. Pinyon-juniper woodlands occur at elevations of 4,500 to 7,000 feet (Lowe and Brown, 1973). Tree species include two-needle pinyon pine, Utah juniper, one seed juniper and, less commonly, alligator juniper. Pinyon-Juniper PNVT covers approximately 23 percent of the area proposed for new pits or expansion areas.

Five species have been identified as priority species of concern. These are gray flycatcher, pinyon jay, gray vireo, black-throated gray warbler, juniper titmouse, and ferruginous hawk. The juniper titmouse is addressed in the MIS section.

High Elevation Grassland Habitat Types

High elevation grassland and montane meadow habitat types are interspersed throughout the assessment area. They make up only a small percentage of the cover types across the forest. High elevation grasslands are found on the higher plateaus of both forests, generally as small, dry montane meadows within the ponderosa pine vegetation type. Some of the more common plants found in these grasslands are Arizona fescue, Kentucky bluegrass, mountain muhly, western wheatgrass, yarrow, Rocky Mountain iris, cinquefoil, blue grama, globemallow and rabbitbrush. The high elevation grasslands PNVT covers less than 1 percent of the area proposed for new pits or expansion areas.

Two species have been identified as species of concern for high elevation grasslands. They are burrowing owl and ferruginous hawk.

Table 16. Migratory Bird Species of Concern with Potential to Occur in Project Area.

Species	PNVT Habitat	Species details and rationale
PONDEROSA PINE		
Northern goshawk <i>Accipiter gentilis</i>	Ponderosa pine	Northern goshawk is both a Forest-sensitive species and an MIS. Refer to the Forest-Sensitive species section for a detailed discussion of this species.
Mexican spotted owl <i>Strix occidentalis lucida</i>	Ponderosa pine Mixed conifer	Mexican spotted owl is both a Forest-sensitive species and a MIS. Refer to the Forest-Sensitive species section for a detailed discussion of this species.
Purple Martin <i>Progne subis</i>	Ponderosa pine	Habitat includes ponderosa pine with open canopy and high snag density. here is the potential for occurrence at proposed sites in ponderosa pine habitat in both Forests.
Cassin's Finch <i>Carpodacus cassinii</i>	Ponderosa pine	Cassin's finch are permanent residents of northern Arizona in open mixed conifer or ponderosa pine. They have potential to occur at some of the proposed rock pit sites.
Cordilleran flycatcher <i>Empidonax difficillis</i>	Ponderosa pine	Species is found in mid-late successional forest of ponderosa pine, Douglas-fir, maple, oak, and aspen with a dense canopy closure. May occur at proposed rock pit sites in ponderosa pine habitat.
Flammulated Owl <i>Otus flammeolus</i>	Ponderosa pine	Species is closely associated with open ponderosa pine forest and aspen. Species has the potential to occur at proposed rock pit sites in ponderosa pine habitat.
Grace's Warbler <i>Dendroica graciae</i>	Ponderosa pine	Species primarily breeds in mature montane pine-oak forests, especially where ponderosa is a prevalent species. Potential to occur on proposed rock pit sites in pinyon-juniper habitat.
Lewis Woodpecker <i>Melanerpes lewis</i>	Ponderosa pine	This woodpecker prefers open areas with large snags including open, park-like ponderosa pine forests. This species has potential to occur on proposed rock pit sites in ponderosa pine habitat.
Olive-sided Flycatcher <i>Contopus borealis</i>	Ponderosa pine	Prefers forest openings and edges within mature ponderosa pine forests with snags. This species has potential to occur on proposed rock pit sites in ponderosa pine habitat.
PINYON JUNIPER HABITATS		
Pinyon Jay <i>Gymnorhinus cyanocephalus</i>	PJ woodland	Pinyon jays are permanent residents in Arizona and are found on dry mountain slopes and foothills, typically in dense, mature pinyon-juniper forests. The species has the potential to occur at some of the proposed rock pit sites on both Forests.
Black-throated gray warbler <i>Dendroica negrescens</i>	PJ woodland & evergreen shrub	Prefers large stands of pinyon-dominated woodland in mid-late secession stage. Often found in dense forest with a canopy. May be found at proposed rock pit sites in pinyon-juniper habitat in both Forests.
Ferruginous hawk <i>Buteo regalis</i>	PJ woodland & evergreen shrub High elevation grasslands	Also found in high elevation habitats below. The ferruginous hawk is a Forest-sensitive species. Refer to the Forest-Sensitive species section for a detailed discussion of this species.
Burrowing owl <i>Athene cunicularia</i>	PJ grassland Montane subalpine grassland	Also found in high elevation grasslands below. The burrowing owl is a Forest-sensitive species. Refer to the Forest-Sensitive species section for a detailed discussion of this species.

Table 16. Migratory Bird Species of Concern with Potential to Occur in Project Area.

Species	PNVT Habitat	Species details and rationale
Gray Flycatcher <i>Empidonax wrightii</i>	PJ evergreen shrub	Prefers open pinyon-juniper forest, often with interspersed ponderosa. Potential to occur on proposed rock pit sites in pinyon-juniper habitat in both Forests.
Juniper titmouse <i>Baeolophus ridgwayi</i>	PJ woodland and evergreen shrub Pinyon-juniper woodland	The juniper titmouse is an MIS. Refer to the MIS species section for a detailed discussion of this species.
HIGH ELEVATION GRASSLANDS		
Burrowing owl <i>Athene cunicularia</i>	PJ grassland Montane subalpine grassland	Also found in pinyon-juniper habitats above. The burrowing owl is a Forest-sensitive species. Refer to the Forest-Sensitive species section for a detailed discussion of this species.
Ferruginous hawk <i>Buteo regalis</i>	High elevation grasslands PJ woodland & evergreen shrub	Also found in pinyon-juniper habitats above. The ferruginous hawk is a Forest-sensitive species. Refer to the Forest-Sensitive species section for a detailed discussion of this species.
FOUND IN ALL MIGRATORY BIRD HABITATS IN THE PROJECT AREA (PONDEROSA, PINYON JUNIPER, HIGH ELEVATION GRASSLANDS)		
Bald eagle <i>Haliaeetus leucocephalus</i>	All	The bald eagle is a Forest-sensitive species. Refer to the Forest-Sensitive species section for a detailed discussion of this species.
American peregrine falcon <i>Falco peregrinus anatum</i>	All	The peregrine falcon is a Forest-sensitive species. Refer to the Forest-Sensitive species section for a detailed discussion of this species.
Golden Eagle <i>Aquila chrysaetos</i>	All	Golden Eagles are found in prairies, tundra, open coniferous forest and barren areas, especially in hilly or mountainous regions, nesting on cliff ledges and in trees. The Youngs Canyon site is adjacent to a nesting site. The species has the potential to utilize proposed rock pit sites throughout the project area for foraging.

3.5.2 THE ANALYSIS OF EFFECTS FOR WILDLIFE

3.5.2.1. Alternative A - No Action

Direct and Indirect Effects

Federally List Threatened, Endangered and Candidate Species

Alternative A - No Action would have no direct or indirect effects on threatened, endangered, and proposed species or their habitats, as no new actions would occur and existing rock sources would be used for temporary road construction and maintenance of existing roads. In general, Alternative A - No Action would maintain existing habitat and protect biodiversity in the short and long terms.

Forest Sensitive Species

Alternative A - No Action would have no direct or indirect effects on Forest Service sensitive species or their habitats, as no new actions would occur and existing rock sources would be used for temporary road construction and maintenance of existing roads. While sensitive species habitat would not be directly affected, increased hauling of road surfacing materials would result and this would result in potential impacts to wildlife due to road traffic. Other threats to species would be the same as those discussed under existing conditions.

In general, Alternative A - No Action would maintain existing habitat and protect biodiversity in the short and long terms.

Management Indicator Species and Migratory Bird Species of Concern

Alternative A - No Action would have no direct effects on MIS or migratory bird species of concern or their habitats, as no new actions would occur. None of the material pits would be developed and operated to provide cinders, gravel, and other aggregate materials for surfacing of unpaved roads for maintenance purposes. While MIS habitat would not be directly affected, increased hauling of road surfacing materials would result and this would result in potential impacts to wildlife due to road traffic since increased hauling results in increased dust and noise to surrounding areas. Other threats to species would be the same as those discussed under existing conditions.

Cumulative Effects

Federally Listed Threatened, Endangered and Candidate Species

Since Alternative A - No Action would not result in any direct changes to forest habitats, but would combine with increased traffic from forest restoration projects on a potential of up to 500,000 acres on the Coconino and Kaibab National Forests over the next 20 years. A cumulative increase in traffic results in dust and noise that can degrade habitat and disturb species that occur near main hauling roads.

Forest Sensitive Species

Since Alternative A - No Action would not result in any direct changes to forest habitats, but would combine with increased traffic from forest restoration projects on a potential of up to 500,000 acres on the Coconino and Kaibab National Forests over the next 20 years. A cumulative increase in traffic results in dust and noise that can degrade habitat and disturb species that occur near main hauling roads.

Management Indicator Species and Migratory Bird Species of Concern

Since Alternative A - No Action would not result in any direct changes to forest habitats, but would combine with increased traffic from forest restoration projects on a potential of up to 500,000 acres on the Coconino and Kaibab National Forests over the next 20 years. A cumulative increase in traffic results in dust and noise that can degrade habitat and disturb species that occur near main hauling roads.

3.5.2.2 Alternative B - Proposed Action

Direct and Indirect Effects

General Wildlife

Rock pit development and operation activities, including use of heavy equipment and vehicles on-site, could directly kill or injure a variety of wildlife species, especially slower moving species, small animals, species that have subsurface burrows, or ground- or shrub-nesting birds. Rock pit development and operation could also cause short-term noise disturbance, fugitive dust, or visual impacts associated with human presence, as well as noise associated with blasting, heavy equipment, and hauling.

Impacts would occur within and adjacent to the rock pit sites. This could cause wildlife to avoid areas adjacent to rock pit sites, alter their foraging, migration, wintering, and breeding behaviors, and could stress animals, making them more susceptible to predation or disease (Radle 2007). Displacement of individuals could increase competition for resources in surrounding habitats, which may or may not be able to support more wildlife. Given the short time period for rock pit use (two use periods of three weeks per year, plus two weeks of hauling), as well as the large amount of available and suitable habitat within the forests, impacts would likely be temporary.

In addition to the creation and expansion of rock pits, approximately 0.48 miles of temporary roads would be required along with 3.25 miles of road improvements. Traffic on roads is likely to temporarily increase during construction of pits as well as during extraction and transport of materials. Increased road use may disturb wildlife and fragment habitat. Research has shown that traffic on roads is a major factor affecting wildlife disturbance and avoidance (US Forest Service 2009a).

Due to the limited mileage of temporary roads that would be created and acres that would be converted, it would be unlikely that these changes would impact reproductive success to the degree that Forest-wide population change would occur; therefore, new road and road improvement are not likely to change Forest-wide habitat or population trends for ponderosa pine MIS.

If all rock pit sites were developed, there would be fewer undisturbed contiguous blocks of habitat within the forests; however, the rock pit sites are very small and would not result in fragmentation of blocks of habitat at any scale. While most suitable habitat is a mosaic of vegetation communities and habitat features, rock pit development would create more edge habitat, which increases predation and the likelihood of noxious weed spread, thus lowering habitat values in the immediate areas surrounding disturbance.

Resource-specific protection measures (Section 2.4), including noxious weed control and prevention, maintenance of wildlife cover, soil and watershed protection, and air quality protection, contribute to the maintenance and preservation of existing native vegetation and would help to reduce impacts on habitat quality. Materials derived from the pits would allow for road maintenance in the form of rock surfacing on unpaved roads and maintenance of adequate drainage. This would reduce long-term erosion from existing unpaved road surfaces, reducing potential long-term impacts to aquatic sensitive species because of reduce erosion from roads.

Species-specific wildlife protection measures (Section 2.4) would also help to reduce impacts and are described below under some species. Implementation of a Reclamation Plan (Section 2.5) would help to restore habitats after rock pit closure.

Federally Listed Threatened, Endangered and Candidate Species

Mexican Spotted Owl (*Strix occidentalis lucida*)

Impacts on the Mexican Spotted Owl, including localized areas of habitat loss, and degradation of the immediate surrounding habitat, and disturbance resulting from dust and noise of pit operation could occur as described above under General Wildlife. While not all ponderosa pine habitat would be suitable for MSO, the proposed project would remove approximately 178 acres of ponderosa pine that could be potentially suitable habitat for the species for foraging activities (Table 5). The relatively small pit sizes, short time period for rock pit use, and the large amount of suitable habitat that would be available throughout the Forests would limit impacts to any known owl pair as well as potential impacts to foraging and nesting owls. In addition, the likelihood of impacts would be reduced by implementing protection measures such as requiring surveys in restricted and protected habitat, and prohibiting disturbance in PACs and within one-half mile of nests and roosts during the breeding season.

Several of the rock pits and expansions proposed by Alternative B - Proposed Action would occur in designated MSO critical habitat (Table 17). The proposed actions would disturb approximately 53.3 acres of MSO critical habitat and 7.1 acres of restricted habitat. Prior to project implementation, US Forest Service biologists, in coordination with USFWS, would review proposed sites to determine if they provide suitable MSO habitat, and to determine appropriate mitigation measures and survey requirements if critical or restricted habitat is present.

Table 17. Alternative B - Proposed Action, Mexican Spotted Owl Habitat Potential Effects (acres).

Pit Name	Critical Habitat	Restricted Habitat	Total Area
Cinch Hook	10.7	0.0	10.7
Davenport	0.0	2.2	2.2
Deadhorse	7.6	0.0	7.6
Lockwood	5.0	0.0	5.0
Macks	4.6	0.0	4.6
Ruin	0.0	4.9	4.9
Snafu	6.1	0.0	6.1
Thomas 2	19.3	0.0	4.8
Totals	53.3	7.1	60.4

California Condor (Gymnogyps californianus)

The proposed rock pit sites do not provide suitable condor nesting habitat, but the proposed project would remove approximately 11 acres of suitable foraging habitat for the species on the Kaibab and Coconino Forests. The relatively small pit sizes, short time period for rock pit use, and the large amount of suitable foraging habitat that would be available throughout the Forests would reduce the likelihood for impacts.

Bald Eagle

The proposed rock pit sites do not provide suitable bald eagle nesting habitat, but the proposed project would remove 230 acres of suitable foraging habitat for the species on the Kaibab and Coconino Forests (Table 5). The relatively small pit sizes, short time period for rock pit use, and the large amount of suitable foraging habitat that would be available throughout the Forests would reduce the likelihood for impacts.

Forest Sensitive Species

American Peregrine Falcon (Falco peregrines anatum)

The proposed rock pit sites do not provide suitable peregrine falcon nesting habitat, but the proposed project would remove approximately 56 acres of suitable foraging habitat for the species on the Kaibab and Coconino National Forests. The relatively small pit sizes, short time period for rock pit use, and the large amount of suitable foraging habitat that would be available throughout the Forests would reduce the likelihood for impacts. The direct effects on American peregrine falcon would be a minor reduction in suitable foraging habitat across both National Forests. Since foraging habitat is in no way a limiting factor to peregrine falcon populations on either Forest, this alternative would have no effect on the peregrine toward listing under the Endangered Species Act.

Northern Goshawk (Accipiter gentilis)

Impacts on northern goshawk, including localized habitat loss, degradation of immediately adjacent habitat, and disturbance near operating pits to the species could occur as described above for all wildlife. The proposed project would remove approximately 179 acres of suitable habitat for the species. Furthermore approximately 0.5 acres of the proposed 222 pit and 4 acres of the proposed Lockwood Expansion are located in Goshawk PFAs. Neither of these PFAs have shown evidence of recent goshawk nesting; however, operation of these pits would impact goshawk habitat by removing trees and creating openings that would last for approximately 20 years. The relatively small pit sizes, short time period for rock pit use, and the large amount of suitable habitat that would be available throughout the two Forests would minimize the likelihood of impacts. In addition, the likelihood of impacts on nesting goshawks would be reduced by implementing protection measures such as prohibiting tree removal during the breeding season.

Ferruginous Hawk (Buteo regalis)

Impacts on the ferruginous hawk, including localized habitat loss, degradation of immediately adjacent habitat, and disturbance near operating pits to the species could occur as described above for all wildlife. The species occurs only on the Coconino National Forest and not on the Kaibab National Forest. The proposed project would remove approximately 17 acres of suitable habitat for the species. The relatively small pit sizes,

short time period for rock pit use, and the large amount of suitable habitat that would be available throughout the Coconino National Forest would reduce the likelihood for impacts.

The likelihood of impacts on nesting ferruginous hawks would be reduced by implementing protection measures such as prohibiting green tree harvest or snag removal during the breeding season. As a result no direct impacts to the ferruginous hawk is expected. Indirect impacts are expected to be so small as to result in no effect on the forest population and thus would not result in a trend toward listing in the Endangered Species Act.

Burrowing Owl (*Athene cunicularia*)

Impacts on burrowing owl including localized habitat loss, degradation of immediately adjacent habitat, and disturbance near operating pits to the species could occur as described above for all wildlife. The proposed project would remove approximately 13 acres of suitable habitat for the species. The relatively small pit sizes, short time period for rock pit use, and the large amount of suitable foraging habitat that would be available throughout the Forests would reduce the likelihood for impacts. Furthermore it is unlikely for the development of rock pits to directly impact burrowing owls because pits are located in areas of bedrock or cinders with few open areas for burrowing species. Indirect impacts are expected to be so small as to result in no effect on the forest population and thus would not result in a trend toward listing in the Endangered Species Act.

Merriam's Shrew (*Sorex merriami leucogenys*)

Impacts on Merriam's shrew, including localized habitat loss, degradation of immediately adjacent habitat, and disturbance near operating pits to the species could occur as described above for all wildlife. The proposed project would remove 230 acres of suitable habitat for the species. The relatively small pit sizes, short time period for rock pit use, and the large amount of suitable foraging habitat that would be available throughout the Forests would reduce the likelihood for impacts. Furthermore it is unlikely for the development of rock pits to directly impact the shrew because pits are located in areas of bedrock or cinders with few open areas for burrowing species. Indirect impacts are expected to be so small as to result in no effect on the forest population and thus would not result in a trend toward listing in the Endangered Species Act.

Spotted Bat (*Euderma maculatum*), Allen's Lappet-Browed Bat (*Idionycteris phyllotis*), Pale Townsend's Big-Eared Bat (*Corynorhinus townsendii pallescens*)

The proposed rock pit sites do not provide suitable rocky roosting habitat for the spotted bat, Allen's lappet-browed bat or the pale Townsend's big-eared bat but the proposed project would remove 230 acres of suitable foraging habitat for these species on the Kaibab and Coconino Forests. The relatively small pit size, short time period for rock pit use, and the large amount of suitable foraging habitat that would be available throughout the Forest would reduce the likelihood for impacts. Indirect impacts are expected to be so small as to result in no effect on the forest population and thus would not result in a trend toward listing in the Endangered Species Act.

Greater Western Mastiff Bat (*Eumops perotis californicus*)

The proposed rock pit sites do not provide suitable roosting habitat for greater western mastiff bat, but the proposed project would remove 124 acres of suitable foraging habitat for the species on the Coconino Forest.

The species is not likely to occur on the Kaibab Forest. The relatively small pit sizes, short time period for rock pit use, and the large amount of suitable foraging habitat that would be available throughout the Forest would reduce the likelihood for impacts.

Dwarf Shrew (Sorex nanus)

Impacts on dwarf shrew, including localized habitat loss, degradation of immediately adjacent habitat, and disturbance near operating pits to the species could occur as described above for all wildlife. The proposed project would impact up to 230 acres of potential habitat for the species. However, there is only 2 acres of suitable habitat for this species on the North Kaibab Ranger District of the Kaibab National Forest. Impacts to suitable habitat for this species are expected to be so small as to result in no effect on the forest population and thus would not result in a trend toward listing in the Endangered Species Act.

Kaibab Squirrel (Sciurus aberti kaibabensis)

Impacts on Kaibab squirrel, including localized habitat loss, degradation of immediately adjacent habitat, and disturbance near operating pits to the species could occur as described above for all wildlife. The proposed project would remove two acres of suitable habitat for the species. Potential impacts would only occur at the Big Ridge rock pit site on the Kaibab Forest. The relatively small pit size, short time period for rock pit use, and the large amount of suitable ponderosa pine habitat that would be available throughout the North Kaibab Ranger District would reduce the likelihood for impacts. Potential impacts to suitable habitat are expected to be so small as to result in no effect on the forest population and thus would not result in a trend toward listing in the Endangered Species Act.

Navajo Mogollon Vole (Microtus mogollonensis navaho)

Impacts on Navajo Mogollon vole, including localized habitat loss, degradation of immediately adjacent habitat, and disturbance near operating pits to the species could occur as described above for all wildlife. The proposed project would remove approximately 107 acres of suitable habitat for the species. The species occurs only on the Kaibab Forest. The relatively small pit sizes, short time period for rock pit use, and the large amount of suitable conifer forest habitat that would be available throughout the Forest would reduce the likelihood for impacts.

Reticulate Gila Monster (Heloderma suspectum suspectum)

Impacts on reticulate Gila monster, including localized habitat loss, degradation of immediately adjacent habitat, and disturbance near operating pits to the species could occur as described above. The proposed project would remove three acres of suitable habitat for the species on the Coconino Forest for up to 20 years prior to reclamation. The species is unlikely to occur on the Kaibab Forest. The relatively small pit sizes, short time period for rock pit use, and the large amount of suitable habitat that would be available throughout the Forest would reduce the likelihood for impacts. Potential impacts to suitable habitat are expected to be so small as to result in no effect on the forest population and thus would not result in a trend toward listing in the Endangered Species Act.

Management Indicator Species for Ponderosa Pine

Short-term and long-term effects in ponderosa pine habitat would occur as described above for All Wildlife. In total, 173 acres of ponderosa pine habitat (as measured by PNVNT) would potentially be removed for new pits or the expansion of existing pits.

Discussions of the effects of Alternative B - Proposed Action on the MIS Mexican spotted owl can be found under the discussion for Federally Threatened and Endangered Species, above. The discussion of effects of this alternative on Kaibab squirrel and Northern Goshawk can be found under the discussion for Forest Sensitive Species, above.

Mexican spotted owl

The owl is associated as an indicator species for late seral mixed conifer and spruce fir habitat. Late seral habitat may occur in new pits and expansion areas that are currently un-impacted. Important habitat attributes used by Mexican spotted owls include cool microclimates, multistoried, multi-species stands with high canopy cover, large numbers of snags, high basal area, rock outcrops and/or cliffs, and small openings.

Late seral ponderosa pine, late seral mixed conifer, and late seral spruce-fir is increasing slightly throughout the Coconino National Forest. Overall, the Forestwide population trend for the Mexican spotted owl is not known for certain, but may be stable to declining and is thought to be declining on the Kaibab National Forests. Reasons for a declining population have been explained authors thought it was reasonable to infer that some general factor, such as weather, was influencing populations (USDAFS 2013), but there are also many studies that have identified as loss and degradation of habitat from factors including livestock grazing, wildfire, timber management, road proliferation, disturbance to nesting owls from recreational use (USFWS 2012).

No pits are located in Protected Activity Centers, however there is approximately 60 acres of pit development and operation to occur in habitat. This amount of impact would affect less than one percent of owl habitat to be managed to protect important habitat elements on each Forest. Removal of up to 60 acres would prevent the development of habitat attributes in these areas for approximately 20 years. The pit locations would contribute to small openings, however, which are identified as an important habitat attribute to the species (USDAFS 2013). The impact of the proposed pits is of such a limited extent given the fact the pits are located far from each other and would result in a very dispersed impact, which would indirectly affect owl habitat. Thus, the project would not have an impact on the population trend of this species on either forest.

Pygmy nuthatch

The proposed project would remove 173 acres of suitable habitat for the species. This could include the removal of some mature ponderosa pine habitat. The species is stable at the Forest level. The Project Area is not the appropriate scale at which to evaluate population viability because it is too small of an area.

It is likely that some snags would be removed and the snags per acre ratio would be reduced in some areas of the Forests. The pits are strategically located to be spread across both forests and thus located several miles from each other. As a result, the impacts would be dispersed and be very small within the landscape they occur. Due to the relatively small pit sizes, short time period for rock pit use, and the amount of suitable

habitat that would be available throughout the Forests, the proposed project is not likely to change Forest-wide habitat or population trends for the pygmy nuthatch.

Turkey

Removal of 173 acres of ponderosa pine habitat would impact roosting habitat available for turkey. Winter habitat in pinyon-juniper and summer range in ponderosa pine may also be impacted by project activities. Project design criteria have been developed to minimize impacts. Timber harvesting would not occur in turkey nesting areas from April 15th to June 30th. And in addition, scattered patches of untreated slash within one-half mile of dependable water would be retained in known or potential turkey nesting areas. The species appears to have been increasing in the Forests in recent years. The pits are strategically located to be spread across both forests and thus located several miles from each other. As a result, the impacts would be dispersed and be very small within the landscape they occur. Due to the relatively small pit sizes, short time period for rock pit use, and the amount of suitable habitat that would be available throughout the Forests, the proposed project is not likely to change Forest-wide habitat or population trends for the turkey.

Hairy woodpecker

This species is dependent upon snags and is a secondary cavity nester. The proposed project would remove 173 acres of suitable habitat for the species. Overall, data indicate that hairy woodpecker populations are stable on a long-range scale. It is likely that some snags would be removed and the snags per acre ratio would be reduced in some areas of the Forests. The pits are strategically located to be spread across both forests and thus located several miles from each other. As a result, the impacts would be dispersed and be very small within the landscape they occur. Due to the relatively small pit sizes, short time period for rock pit use, and the amount of suitable habitat that would be available throughout the Forests, the proposed project is not likely to change Forest-wide habitat or population trends for the hairy woodpecker.

Elk

Elk are indicators of early seral ponderosa pine, mixed conifer, and spruce-fir. While early seral stages of ponderosa pine and mixed conifer are important, elk are generalists and use a wide variety of seral stages and habitats. The proposed project would remove 173 acres of ponderosa pine habitat for approximately 20 years, some of which is likely suitable habitat used by the species. Additional minor impacts may occur due to project activities in pinyon-juniper habitat, which the species may use in winter months.

Rock pits such as Big Draw and Hostetter 2 are located in areas with nearby elk migration corridors and may result in a disturbance of elk movement during the spring or fall. In addition, construction and operations noise could disrupt normal fawning activities in the area surrounding each pit. Project design criteria have been developed to require deferment of tree removal, blasting, and crushing activities from May 15th to June 30th in known fawning and calving areas to minimize impacts. The pits are strategically located to be spread across both forests and thus located several miles from each other. As a result, the impacts would be dispersed and be very small within the landscape they occur. Furthermore, this species is a generalist and has been increasing in population on the Coconino and Kaibab (south zone). Due to the relatively small pit sizes, short time period for rock pit use, and the amount of suitable habitat that would be available throughout the Forests, the proposed project is not likely to change Forest-wide habitat or population trends for the elk.

Red-naped sapsucker

Red-naped sapsucker is an indicator species for aspen habitat. Aspen are not monitored as a separate PNVT in the Forests. It is possible that small, isolated individual or groups of aspen may occur in the project area in ponderosa pine habitat. As a result of the minimal acres of suitable habitat disturbed, impacts on the species are likely to be negligible. As a result of this negligible impact to aspen, there is likely to be no impact to red-naped sapsuckers on the national forest. The proposed project is not likely to change Forest-wide habitat or population trends for the sapsucker.

Management Indicator Species for Pinyon-Juniper

Short-term and long-term effects would occur as described above for All Wildlife. Six acres of pinyon-juniper woodland and evergreen habitat would potentially be removed in the creation of new rock pits or the expansion of existing pits.

Mule Deer

The mule deer was selected as an indicator species of early-seral stages of aspen and pinyon-juniper woodlands. The proposed project would remove 6 acres of pinyon-juniper woodland habitat for approximately 20 years. Early-seral stages of ponderosa pine, mixed conifer, and chaparral habitats are also important for this species, and thus project activities in these habitats may have additional minor impacts on the species. Project design criteria have been developed to require deferment of tree removal, blasting, and crushing activities from May 15th to June 30th in known fawning and calving areas to minimize impacts. Due to the relatively small pit sizes, short time period for rock pit use, and the amount of suitable habitat that would be available throughout the Forests, the proposed project is not likely to change Forest-wide habitat or population trends for the mule deer.

Juniper titmouse

Under Alternative B - Proposed Action, direct effects include loss of 6 acres of early, mid, or late seral structural stage in pinyon-juniper woodland. While this alternative may result in some reduction in habitat availability, it would be unlikely that these changes would impact reproductive success to the degree that Forest-wide population change would occur. One reason for this is that the pits are strategically located to be spread across both forests and thus located several miles from each other. As a result, the impacts would be dispersed and be very small within the landscape they occur. Due to the relatively small pit sizes, short time period for rock pit use, and the amount of suitable habitat that would be available throughout the Forests, the proposed project is not likely to change Forest-wide habitat or population trends for the juniper titmouse.

Management Indicator Species for High Elevation Grasslands

Short-term and long-term effects would occur as described above. In total, 16.2 acres of grassland habitat (Montane Subalpine grassland and Pinyon Juniper grassland PNVTS) would potentially be removed in the creation of new rock pits or the expansion of existing pits.

Pronghorn antelope

Pronghorn are dependent on forest openings and grasslands. The proposed project would remove 16.2 acres of suitable habitat for the species. One site, Youngs Canyon, is adjacent to pronghorn habitat, and activities on

this site are therefore likely to impact the species due to construction and operations noise, human presence, and traffic. This would reduce the potential habitat available to the pronghorn on the Coconino National Forest a fraction of a percent. As a result of this very limited impact, the proposed project is not likely to change Forest-wide habitat or population trends for the pronghorn.

Migratory Bird Species of Concern

Migratory birds would be susceptible to direct impacts of disturbance and potential for individual mortality, particularly if pit construction and operations occurred during the migratory bird breeding season. Should construction occur during the nesting season, it is recommended that all pit sites be surveyed for nesting birds prior to removal of vegetation and any nesting sites be avoided until the young have left the nest. In addition, potential long-term impacts include but are not limited to habitat loss and fragmentation, as well as loss of prey species.

Cumulative Effects and Species Determination for Threatened, Endangered, Candidate and Sensitive Species

All Wildlife

The Forest is an important resource providing for a wide variety of public recreational activities, which are expected to continue to increase in the future as the human population increases. To accommodate the increasing number of people recreating on Forest lands, more facilities (infrastructure) will need to be developed. In areas of concentrated public recreation use such as roads, formal and dispersed camping areas, hiking trails, etc., effects to terrestrial and aquatic resources would contribute to the cumulative impacts of this project. Recreational noise can disturb species during sensitive time periods. In addition, roads contribute to habitat fragmentation, increased erosion, and sedimentation into nearby streams. The presence of fine sediments in streams adversely affects fish assemblages.

Formal and dispersed camping, in general, contribute to loss and trampling of terrestrial vegetation and an increase in bare ground. The loss of vegetation and an increase in bare ground would cause elevated erosion rates and increased sedimentation into nearby streams. In areas where general recreation use is low (e.g., backcountry), effects from public recreational activities may be of less influence on vegetation and wildlife.

Increased use of off-highway vehicles for recreational use has resulted in an extensive unauthorized network of trails and two-track roads. The continued creation of new roads/trails would continue to destroy vegetation and increase erosion and sedimentation, negatively impacting terrestrial vegetation and aquatic habitat. Many studies and reports have identified the presence, density, and use of roads as a main factor affecting wildlife populations at the landscape scale. Human access facilitated by roads/routes may also increase the likelihood of human-caused wildfires and the spread of invasive plant and aquatic species. Travel management planning efforts on the Coconino and Kaibab Forests would help to concentrate off-highway vehicle use on designated routes and reduce these impacts.

In addition, vegetation and fuels management activities, including those for habitat improvements and restoration efforts. Many of these actions, such as fuels reduction, thinning, and prescribed fire, would remove

habitat over the short term. Over the long term, these activities would improve habitat for species by improving habitat composition and structure and by reducing the likelihood of a catastrophic fire, improving forest habitat, diversity, and structure for wildlife.

Alternative B - Proposed Action would contribute to cumulative effects by removing habitat in the both the long and short terms. The cumulative effect of Alternative B - Proposed Action with other actions would be to potentially affect individuals of these species but not lead to a loss of viability of these species in the Coconino or Kaibab National Forests.

Federally Listed Threatened, Endangered and Candidate Species

Mexican Spotted Owl (*Strix occidentalis lucida*) and MSO Critical Habitat

The proposed action alternative would affect approximately 60 acres of potential owl habitat. This could cumulatively combine with development of transmission lines and a pipeline to fragment MSO habitats or movement corridors. Transmission lines could create barriers to MSO movement, potentially causing injury or mortality to the species. While none of the proposed rock pit sites would physically overlap with these present and reasonably foreseeable utility projects, it is expected there would be an indirect impact of cumulative loss of owl habitat. The rock pits would contribute to this cumulative impact for a approximately 20 years.

Continued operation of existing material disposal and storage pits are unlikely to impact MSO, as these are already developed, are likely avoided by MSO, and are unlikely to provide potential MSO habitat.

There is expected to be up to 500,000 acres of tree thinning and prescribed fire treatments for forest health and restoration as well as wildfire risk reduction on the Coconino and Kaibab national forests over the next 20 years. Several of these projects including the Flagstaff Watershed Protection Project, Upper Beaver Creek Watershed Health Project, Bill Williams Watershed Protection Project, and possibly others including the Mahan Landmark Forest Restoration Project will have impacts to owls from disturbance and will affect owl habitat. None of the rock pit locations are expected to result in direct disturbance to any identified owls and thus would not result in a direct cumulative effect.

Many of the future projects are also likely to affect potential owl habitat. Restoration projects would have a short-term effect of 1-2 years after implementation, but are expected to improve owl habitat in the long-term by improving the abundance of primary constituent elements such as large-diameter trees and snags. Thus there could be a short-term cumulative effect to critical habitat as restoration projects are implemented.

Some projects such as the Flagstaff Watershed Protection Project and unplanned high-intensity wildfires, will impact owl habitat by affecting primary constituent elements over the long-term and will cumulatively combine to affect critical habitat. The project's impact of 60 acres would be so dispersed that and of such a small magnitude throughout the critical habitat identified on the Coconino and Kaibab National Forests that it would contribute approximately 0.007% of critical habitat. Thus, the effects of this alternative would contribute to cumulative impacts to owl critical habitat, but these effects are so small as to be overshadowed by the effects of other activities and actions.

Alternative B - Proposed Action may affect but is not likely to adversely affect the MSO.

California Condor (Gymnogyps californianus) and Bald Eagle (Haliaeetus leucocephalus)

Alternative B – The Proposed Action would have no direct effects to the bald eagle and are not likely to result in disturbance to eagle nests due to distance of the proposed pits to known nests. Pits located within a few miles from bald eagles may affect eagle foraging behavior. Other activities such as Forest Restoration treatments could cumulatively combine with disturbance from pit locations to change bald eagle patterns; however forest restoration activities would generally be limited to a number of weeks in any specific area. This alternative may affect but is not likely to adversely affect the bald eagle.

Depending on their location, future foreseeable actions could remove foraging habitat for California condors over the long term. Alternative B - Proposed Action may affect the use of some areas for foraging for individual birds. Therefore, the Proposed Action may impact individuals, but would not cause a loss of viability in the planning area or a loss of species viability rangewide for the California condor.

Forest Sensitive Species

The direct and indirect effects of Alternative B - Proposed Action, combined with the past, present, and reasonably foreseeable future actions, are likely to impact habitat for sensitive species to some degree, as described for Cumulative Effects for all wildlife, above. Short-term impacts on sensitive species due to reasonably foreseeable future activities are likely to include disturbance and habitat fragmentation (Table 18). In addition, development and recreation are likely to continue in the area.

The Travel Management Plans for both forests currently being implemented, will have a positive impact on American peregrine falcon. For all the Forest Sensitive Species discussed below, Alternative B - Proposed Action may impact individuals, but is not likely to lead toward federal listing. This project would not cause a loss of viability in the planning area or a loss of species viability rangewide.

American Peregrine Falcon (Falco peregrines anatum)

Development of transmission lines and a pipeline could fragment habitats or movement corridors, and transmission lines could present barriers to peregrine falcon movement, potentially causing injury or mortality to the species. The Travel Management Plans for both forests currently being implemented, will have a positive impact on American peregrine falcon. Considering direct, indirect and cumulative effects, the Proposed Action may impact the peregrine falcon through the removal of 56 acres of potential foraging habitat but is not likely to result in a loss of viability or trend toward federal listing.

Table 18. Cumulative Effects to Forest Sensitive Species - Alternatives B and C (acres)¹⁰.

Sensitive Species	Loss of Nesting Habitat	Loss of Foraging Habitat	Loss of Suitable Habitat	Rationale
American peregrine falcon <i>Falco peregrinus anatum</i>	0.0	56.0		Development of transmission lines and a pipeline could fragment habitats or movement corridors. Transmission lines could present barriers to movement, potentially causing injury or mortality
Northern Goshawk <i>Accipiter gentilis</i>			179.0	The Four Forest Restoration Initiative would provide higher quality habitat that would benefit goshawks.
Ferruginous hawk <i>Buteo regalis</i>			17.0	The Four Forest Restoration Initiative would provide more grasslands that could become habitat.
Burrowing owl <i>Athene cunicularia</i>			13.0	The Four Forest Restoration Initiative would provide more grasslands that could become owl habitat.
Merriam's shrew <i>Sorex merriami leucogenys</i>			230.0	
Spotted bat <i>Euderma maculatum</i>		230.0		The Travel Management Plans will have a positive impact on by reducing access and activity near potential habitat.
Allen's lappet-browed bat <i>Idionycteris phyllotis</i>		230.0		The Travel Management Plans will have a positive impact by reducing access and activity near potential habitat, and providing increased retention of snags.
Pale Townsend's big-eared bat <i>Corynorhinus townsendii pallescens</i>		230.0		The Travel Management Plans will have a positive impact on by reducing access and activity near caves.
Greater western mastiff bat <i>Eumops perotis californicus</i>		124.0		The Travel Management Plans will have a positive impact by eliminating cross-country travel.
Dwarf shrew <i>Sorex nanus</i>				No habitat directly or indirectly affected. The Travel Management Plans will have a positive impact by reducing access to and activity near occupied sites, reducing disturbance to individuals.
Kaibab squirrel <i>Sciurus aberti kaibabensis</i>			2.0	The Travel Management Plan will benefit Kaibab squirrel by reducing disturbance.
Navajo Mogollon vole <i>Microtus mogollonensis navaho</i>			107.0	The Travel Management Plans will benefit Navajo Mogollon vole by reducing access to and activity near occupied sites, reducing disturbance to individuals.
Reticulate gila monster <i>Heloderma suspectum suspectum</i>			3.0	The Travel Management Plans will benefit reticulate Gila monster by reducing reducing disturbance from motorized vehicles.

¹⁰ The loss of nesting, foraging and suitable habitat are the same for direct, indirect and cumulative effects.

Northern Goshawk (Accipiter gentilis)

Alternative B - Proposed Action would avoid and mitigate impacts on goshawk, although 179 acres of goshawk habitat would be removed. The Travel Management Plans for both forests currently being implemented, and is expected to have a long-term positive impact on northern goshawk habitat. The Four Forest Restoration Initiative would also provide higher quality habitat that would benefit northern goshawks. Considering direct, indirect and cumulative effects, the Proposed Action may impact the Northern goshawk through the removal of 179 acres of habitat but is not likely to result in a loss of viability or trend toward federal listing.

Ferruginous Hawk (Buteo regalis)

Alternative B - Proposed Action would avoid and mitigate for impacts on nesting ferruginous hawks, although 17 acres of potential habitat would be removed. The Travel Management Plans for both forests currently being implemented, will have a positive impact on ferruginous hawk habitat. The Four Forest Restoration Initiative would provide more grasslands that could become ferruginous hawk habitat. Considering direct, indirect and cumulative effects, the Proposed Action may impact the ferruginous hawk through the removal of 20 acres of potential habitat but is not likely to result in a loss of viability or trend toward federal listing.

Burrowing Owl (Athene cunicularia)

Alternative B - Proposed Action would avoid and mitigate for impacts on nesting burrowing owls, although 13 acres of potential habitat would be removed. The Travel Management Plans for both forests currently being implemented, will have a positive impact on burrowing owl habitat. The Four Forest Restoration Initiative would provide more grasslands that could become burrowing owl habitat. Considering direct, indirect and cumulative effects, the Proposed Action may impact the burrowing owl through the removal of 13 acres of potential habitat but is not likely to result in a loss of viability or trend toward federal listing.

Merriam's Shrew (Sorex merriami leucogenys)

Under Alternative B - Proposed Action, 230 acres of potential habitat would be removed. The Travel Management Plans for both forests currently being implemented, will have a positive impact on Merriam's shrew habitat. Considering direct, indirect and cumulative effects, the Proposed Action may impact the Merriam's shrew through the removal of 230 acres of potential habitat but is not likely to result in a loss of viability or trend toward federal listing.

Spotted Bat (Euderma maculatum)

Alternative B - Proposed Action would remove 230 acres of potential spotted bat foraging habitat, however the amount of remaining habitat on both forests is large. Spotted bats can forage in several different vegetation types on both forests. The Travel Management Plans for both forests currently being implemented, will have a positive impact on spotted bat by reducing access and activity near potential habitat. Considering direct, indirect and cumulative effects, the Proposed Action may impact the spotted bat through the removal of 230 acres of potential habitat but is not likely to result in a loss of viability or trend toward federal listing.

Allen's Lappet-Browed Bat (Idionycteris phyllotis)

Alternative B - Proposed Action would remove 230 acres of potential Allen's lappet-browed bat foraging habitat, however the amount of remaining habitat on both forests is large. Allen's lappet-browed bats can forage in several different vegetation types on both forests. The Travel Management Plans for both forests currently being implemented, will have a positive impact on Allen's lappet-browed bat by reducing access and activity near potential habitat, and providing increased retention of snags. Considering direct, indirect and cumulative effects, the Proposed Action may impact the Allen's lappet-browed bat through the removal of 230 acres of potential habitat but is not likely to result in a loss of viability or trend toward federal listing.

Pale Townsend's Big-Eared Bat (Corynorhinus townsendii pallescens)

Alternative B - Proposed Action would remove 230 acres of potential pale Townsend's big-eared bat foraging habitat, however the amount of remaining habitat on both forests is large. Pale Townsend's big-eared bats can forage in several different vegetation types on both forests. The Travel Management Plans for both forests currently being implemented, will have a positive impact on pale Townsend's big-eared bat by reducing access and activity near caves. Considering direct, indirect and cumulative effects, the Proposed Action may impact the pale Townsend's big-eared bat through the removal of 230 acres of potential habitat but is not likely to result in a loss of viability or trend toward federal listing.

Greater Western Mastiff Bat (Eumops perotis californicus)

Alternative B - Proposed Action would remove 124 acres of potential greater western mastiff bat foraging habitat, however the amount of remaining habitat on both forests is large. Greater western mastiff bats can forage in several different vegetation types on both forests. The Travel Management Plans for both forests currently being implemented, will have a positive impact on greater western mastiff bat by eliminating cross-country travel. Considering direct, indirect and cumulative effects, the Proposed Action may impact the greater western mastiff bat through the removal of 124 acres of potential habitat but is not likely to result in a loss of viability or trend toward federal listing.

Dwarf Shrew (Sorex nanus)

Under Alternative B - Proposed Action, no habitat for the dwarf shrew would be effected. The Travel Management Plans for both forests currently being implemented, will have a positive impact on dwarf shrews by reducing access to and activity near occupied sites, reducing disturbance to individuals. Considering direct, indirect and cumulative effects, the Proposed Action may impact the dwarf shrew but is not likely to result in a loss of viability or trend toward federal listing.

Kaibab Squirrel (Sciurus aberti kaibabensis)

Under Alternative B - Proposed Action, two acres of potential Kaibab squirrel habitat would be removed. The Kaibab Travel Management Plan currently being implemented, will have a positive impact on Kaibab squirrel habitat by reducing disturbance. Considering direct, indirect and cumulative effects, the Proposed Action may impact the Kaibab squirrel but is not likely to result in a loss of viability or trend toward federal listing.

Navajo Mogollon Vole (*Microtus mogollonensis navaho*)

Under Alternative B - Proposed Action, 107 acres of potential Navajo Mogollon vole habitat would be removed. The Travel Management Plans for both forests currently being implemented, will have a positive impact on Navajo Mogollon vole by reducing access to and activity near occupied sites, reducing disturbance to individuals. Considering direct, indirect and cumulative effects, the Proposed Action may impact the Navajo Mogollon vole but is not likely to result in a loss of viability or trend toward federal listing.

Reticulate Gila Monster (*Heloderma suspectum suspectum*)

Under Alternative B - Proposed Action, three acres of potential reticulate Gila monster habitat would be removed. The Travel Management Plans for both forests currently being implemented, will have a positive impact on reticulate Gila monster by reducing reducing disturbance from motorized vehicles. Considering direct, indirect and cumulative effects, the Proposed Action may impact the reticulate Gila monster but is not likely to result in a loss of viability or trend toward federal listing.

Management Indicator Species for Ponderosa Pine

Cumulative effects to MIS for ponderosa pine habitat would occur as described above for All Wildlife. For all MIS for ponderosa pine included in this analysis, the proposed actions of Alternative B - Proposed Action would contribute to cumulative loss of habitat with the loss of 173 acres of potentially suitable habitat. More detailed discussions of the cumulative effects of Alternative B - Proposed Action on the MIS Mexican spotted owl can be found under the discussion for Federally Threatened and Endangered Species, above. More detailed discussions of the cumulative effects of this alternative on Kaibab squirrel and Northern Goshawk can be found under the discussion for Forest Sensitive Species, above.

Management Indicator Species for Pinyon Juniper

Cumulative effects to MIS for pinyon-juniper habitat would occur as described above for All Wildlife. For all MIS for pinyon-juniper included in this analysis, the proposed actions of Alternative B - Proposed Action would contribute to cumulative loss of habitat with the loss of 6 acres of potentially suitable habitat.

Management Indicator Species for High Elevation Grasslands

Pronghorn antelope

Cumulative effects to pronghorn antelope would occur as described above for All Wildlife. The proposed actions of Alternative B - Proposed Action would contribute to cumulative loss of habitat with the loss of 16.2 acres of potentially suitable habitat.

Migratory Bird Species of Concern

This alternative may result in cumulative impacts due to a loss of vegetation and fragmentation of key bird habitats such as grasslands and pinyon-juniper. Area lost for these habitats would add to the habitat lost due to livestock grazing, implementation of vegetation management projects, utility line construction and maintenance, private land development, streamside recreation, recreation infrastructure development, and maintenance.

3.5.2.3 Alternative C

Direct and Indirect Effects

The direct and indirect effects of Alternative C would be the same as those described for Alternative B - Proposed Action for the majority of species. Under this alternative, all proposed pits discussed under Alternative B - Proposed Action would be retained with the exception of the Young's Canyon site. Due to the small amount of acres removed from consideration, impacts on species in this habitat are not likely to be different than those discussed under Alternative B - Proposed Action. The Young's Canyon site is located on pinyon-juniper grassland habitat. Removal of this site from consideration would eliminate the potential for impacts on 11 acres of pinyon-juniper grasslands and leave impacts on only 3.7 acres, thereby reducing the impact on species that utilize this habitat type. Notably, the Young's Canyon site is adjacent to pronghorn (MIS species) habitat and in the vicinity of a potential Golden eagle nest (Migratory Bird Species of Concern). Impacts on these species would be minimized by removal of this site from consideration.

Cumulative Effects

Cumulative effects from Alternative C would generally be as described for Alternative B - Proposed Action. Restoration of rock pit sites at other locations in the Forest, as described for this alternative, would reduce overall cumulative effects on all species in the long term by making these sites potentially available once habitat restoration is complete.

3.6 WATERSHED AND SOIL RESOURCES ---

3.6.1 EXISTING CONDITIONS FOR WATERSHED AND SOILS

The Coconino and Kaibab National Forests cover part three large watersheds, or basins, and 9 sub-basins (Table 19). On the Kaibab and Coconino National Forests, there are few perennial streams but ephemeral streams are common. Ephemeral streams are common on the landscape and flow only when the snow is melting or during and shortly after heavy rainstorms. The flow regimes are characterized as flashy with rapidly rising peaks in response to rapid snow melt in the spring and in response to high-intensity short-duration rain storms in the summer. Riparian vegetation is uncommon and is most often associated with wetlands, but may also be found at springs, ponds, reservoirs, and short reaches of intermittent streams.

Table 19. Project Area Basins and Sub-Basins.

Basin	Sub-basin
Little Colorado	Canyon Diablo
	Middle Little Colorado
	Lower Little Colorado
Verde	Lower Verde
	Upper Verde
	Big Chino-Williamson Valley
Lower Colorado-Lake Mead	Havasupai Canyon
	Lower Colorado-Marble Canyon
	Kanab

The following is a summary of overall watershed conditions and water quality on the Coconino National Forest (US Forest Service 2009b).

Currently, about 62% of the soils are in satisfactory soil condition, about 20% are impaired, about 7% are in unsatisfactory condition, and about 11% are inherently unstable. Human disturbances during the last 100 – 125 years are believed to have caused impacts and declines in soil condition (USDA Forest Service 2009b). Major disturbances that were absent historically include: livestock and elk herbivory, vegetative treatments, dispersed recreational and off highway vehicle use, and establishment and use of roads and trails. Fire is a disturbance that existed historically, but is now largely absent at past frequencies and severities. Historic fire regimes maintained many portions of the Ponderosa Pine and Piñon Juniper Evergreen Shrub PNTs in open stands with more herbaceous and vegetative ground cover that supported satisfactory soil conditions (USDA Forest Service 2007a).

The following is a summary of overall watershed conditions and water quality on the Kaibab National Forest (USDA Forest Service 2008b).

Currently, watershed conditions on the Kaibab National Forest are generally satisfactory. Unsatisfactory soil conditions within these watersheds have contributed to a decline in some areas, particularly in the desert and piñon-juniper communities. Past livestock grazing and the lack of fire have contributed to these downward trends. Currently, vegetation departures from historic conditions pose risks to a number of watersheds from the threat of large fires and the increase in fuels in these watersheds. Fires occurring in areas with high fuel loadings burn with high intensities, damage soils, remove ground cover, and deliver large sediment loads to stream channels.

The only water body on the Forest that has been classified by ADEQ into an EPA water quality category (EPA 2008a) is Whitehorse Lake, a constructed impoundment. Sampling has been conducted periodically from 1993 to 2006. In 1998, Whitehorse Lake was considered an “Impaired Water” for exceeding the turbidity standard for Aquatic and Coldwater Fisheries designated use (ADEQ 2008). From 1997-2000, the lake exceeded standards in dissolved oxygen, pH, and turbidity standards. In 2002, the lake exceeded standards in dissolved oxygen standard. ADEQ classified the lake as Category 5 for high pH, fish kills in 1994, excessive ammonia and turbidity. In 2006, ADEQ placed Whitehorse Lake into an improved class, Category 2 “Attaining Some Uses” where it remains.

The US Forest Service recently completed a Watershed Condition Framework (US Forest Service 2011c) that provides a watershed condition assessment on a 6th Level watershed scale. This assessment is intended to be used to guide restoration efforts but also provides a classification system that identifies watershed condition based on several parameters. Watersheds are assigned a level of watershed integrity as described in Table 20.

Table 20. Watershed Condition Class Descriptions¹¹.

Watershed Condition Class	Functionality	Further Description
1	Functioning properly	A watershed that is functioning in a manner similar to natural wildland conditions. Has minimal undesirable human impact on natural, physical or biological processes and is resilient and able to recover to the desired condition when or if disturbed by large natural disturbance or land management activities.
2	Functioning at risk	
3	Impaired function	Has impaired function because some physical, hydrological or biological threshold has been exceeded. Substantial changes to the factors that cause the degraded state are commonly needed to set them on a trend or trajectory of improving conditions that sustain physical, hydrological and biological integrity.

The classifications of watersheds in the Project Area are displayed on Figures 8 and 9 and described in more detail in the Watershed and Soils Specialist Report for the Rock Pits Project. The 6th Level watersheds that contain proposed rock pits are listed on Table 21 along with the watershed condition classification. The most common parameters to be rated as poor are “fire regime” and “roads and trails”.

¹¹ As described by Karr and Chu, 1999; Lackey, 2001 and Yount and Neimi, 1990.

Table 2I. Watershed Condition Class within Watersheds with Proposed Rock Pits.¹²

Pit Name	6- Level Watershed	Condition Class
222 Pit	Upper Rio de Flag	2
Big Aso	Big Aso Tank	2
Big Draw	West Fork Oak Creek	1
Big Ridge	Rock Canyon	2
Buck Butte	Brady Canyon	2
Bushy Knoll	Lower Willow Valley	2
Cinch Hook	Upper Fossil Creek	2
Crazy Cow	Coconino Wash Headwaters	2
Davenport	Bear Canyon	3
Deadhorse	Big Spring Canyon	3
Dillman	Middle Red Horse Wash	2
Dog Knobs	Dent and Sayer Tank	2
Double A	Upper Cataract Creek	2
Fitzgerald	Garden Tank-Partridge Creek	2
Fues	Upper Red Lake Wash	3
Hostetter 2	Bear Jaw Canyon	2
Jackass Knoll	MC Canyon	3
Kaibab Site 1-A	Coconino Wash Headwaters	2
Kaibab Site 2-C	Red Horse Wash Headwaters	1
Kaibab Site 4-A	Coconino Wash Headwaters	2
Lockwood	East Clear Creek-Clear Creek	2
Macks	Long Valley Draw	2
Marteen	Middle Spring Valley Wash	1
Moonset	Sawmill Tank	3
Oak Grove	Red Tank Draw	2
Perry Lake	Walnut Creek-Upper Lake Mary	3
Pine Hill Cinders	Kinnikinick Canyon	2
Pittman Valley	Pitman Valley-Scholz Lake	3
Riordan Pit	Telephone Tank	1
Ruin	Middle Sycamore Creek	2
Saddle Mtn.	Upper Cedar Wash	2
Salmon Lake	Upper Fossil Creek	2
Smoot Lake	Smoot Lake	2
Snafu	Long Valley Draw	2
Thomas 2	Walnut Creek-Lower Lake Mary	2
Turkey Knob	Tremaine Lake	2
W Triangle	Upper Spring Valley Wash	3
Willard Springs	Munds Canyon	1
Youngs Canyon	Youngs Canyon	2

¹² The Poor Ratings are specified for each watershed in JW Associates 2013A. Classifications are defined in Table 20.

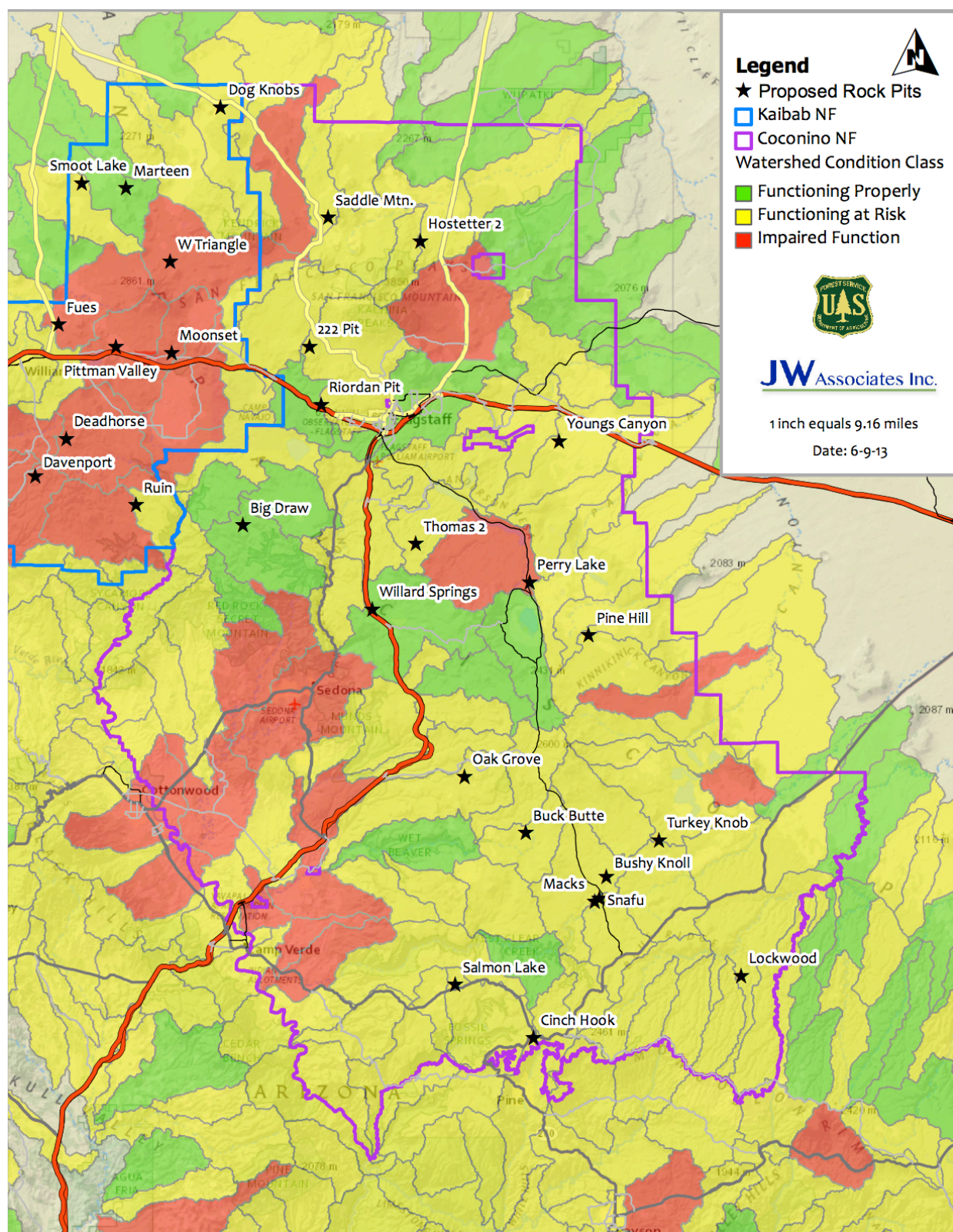


Figure 8. Coconino National Forest Watershed Condition Map

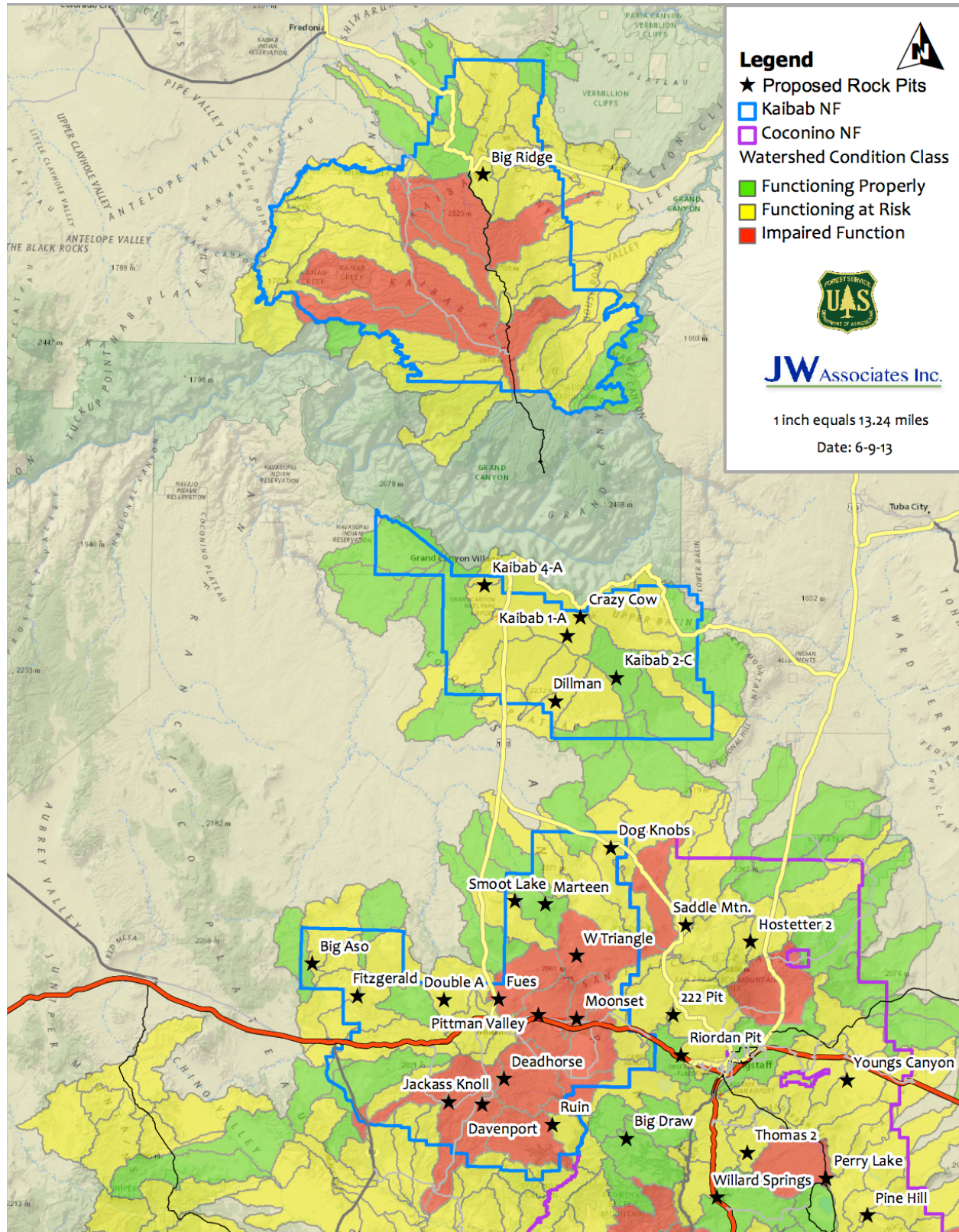


Figure 9. Kaibab National Forest Watershed Condition Map

3.6.2 THE ANALYSIS OF EFFECTS FOR WATERSHED AND SOILS

3.6.2.1 Alternative A - No Action

Direct and Indirect Effects

Water Quality

Traffic has been shown to increase the amount of fine sediment on roads and consequently the potential for increasing sediment yield from roads to water bodies (Grace and Clinton 2007). Although this alternative would not result in an increase in the miles of roads, the amount of truck traffic to haul road surfacing (157,000 miles) would be substantially greater than the 39,000 miles driven in Alternatives B and C. Therefore, Alternative A - No Action would have a greater potential of increased sediment yield than the other alternatives. Increased sediment yield by itself does not constitute an impact on water quality because the sediments leaving the road would have to enter a water body in large enough quantities to cause a change in beneficial uses. The use of Best Management Practices (BMPs) would reduce the sediment yield from roads and would specifically minimize sediment yield entering water bodies, however maintaining roads to appropriate standards would be more difficult in Alternative A - No Action due to the higher haul costs.

Higher hauling costs is expected to result in less general maintenance of unsurfaced roads and this will affect water quality in those watersheds that are currently identified as impaired because of road/trail impacts. There are currently 12 impaired watersheds rated as poor for Roads/Trails on the Coconino National Forest and 19 watersheds similarly rated on the Kaibab National Forest (Table 21). There are 741 miles of unpaved roads within those watersheds on the Coconino National Forest and 1,461 miles on the Kaibab National Forest (Table 22) for a total of more than 2,200 miles of unpaved roads in impaired watersheds due to roads and trails. The higher costs for surfacing these roads would result in fewer miles of roads surfaced. Fewer miles of roads surfaced combined with an increase in miles driven compared to the other alternatives would result in continued water quality impacts in the 31 watersheds identified as impaired and rated as poor for Roads/Trails. Water quality may be directly or indirectly affected by Alternative A - No Action compared to the existing conditions.

Table 22. Unpaved Roads in Impaired Watersheds¹³.

Forest	Impaired Watersheds/Area (acres)	Unpaved Roads in Impaired Watersheds (miles)
Coconino National Forest	12 watersheds, 237,309 acres	741.5
Kaibab National Forest	19 watersheds 463,163 acres	1,461.4
Totals	31 watersheds, 700,471 acres	2,202.9

¹³ US Forest Service Watershed Condition Framework using impaired watersheds rated poor for Roads/Trails

Soil Resources

The existing pits would not be expanded and therefore soil productivity at those sites would remain similar to the existing conditions. The direct and indirect effects of Alternative A - No Action on soil resources would be minor losses of soil productivity at existing pits that are active.

Cumulative Effects

Water Quality

There are a number of current and future foreseeable activities that could impact water quality within the Coconino and Kaibab National Forests over the next 10 years (Appendix A). Activities most likely to result in a cumulative effect with this alternative include increasing road use, new road rules put in place on both Forests from recent travel management decisions, and forest restoration projects such as the Four Forest Restoration Project. Combined, the Coconino and Kaibab national forests receive almost 3.4 million visitors each year. The majority of forest visitors drive on Forest roads contributing to the break-down of road surfacing materials and sediment flow from the road surface. This high level of visitation is expected to continue and may slightly increase over the next 10 years in both forests based on national trends of increasing participation in outdoor activities (Cordell 2012). The increasing use of National Forest System lands is expected to lead to a corresponding increase in the use of Forest System Roads and thus an increasing amount of sediment to downstream watershed sources. This increasing traffic on Forest roads on the Coconino and Kaibab national forests would cumulatively combine with a less road surfacing (which would occur under this alternative compared to either action alternative) to contribute sediment from unpaved forest roads to downstream perennial waterways.

Another key activity that would cumulatively affect water quality in watersheds of the Coconino and Kaibab national forests include the recent road designations and closures resulting from the 2005 Travel Management regulations. In 2010 and 2011 both the Kaibab and Coconino National Forests began implementing new travel management rules (North Kaibab Ranger District began implementation in 2013) that restrict motor vehicle use to designated roads, trails, and areas with some exceptions. Over the next ten years, these activities are expected to decrease off-road motor vehicle travel and closure of several miles of roads due to watershed concerns. Although this may reduce the ongoing sediment from motor vehicle travel on roads without adequate surfacing materials, it will also increase and concentrate motor vehicle use on designated routes. Without adequate surfacing material available, there may be an increase in sediment loss from designated routes due to implementation of the new travel management rules.

Forest restoration activities occurring over the next decade will likely result in a cumulative increase of sediment transfer from roads to water sources in the many watersheds located across the south Kaibab and Coconino National Forests. Landscape scale projects such as the Four Forest Restoration Initiative in addition to approximately 100,000 acres of other restoration based forest treatments would increase traffic from log trucks as well as an increase the need for road surface material for temporary road construction and road maintenance. This alternative would provide no nearby sources for road surfacing. Since there are only a few existing pits that can be used, there will likely be an need for additional hauling from nearby commercial

sources (Flagstaff, Verde Valley, Winslow), and would likely resulting in additional wear and tear on connecting forest roads. Without adequate road maintenance, restoration activities that include extensive hauling and temporary road construction would contribute cumulatively to sediment from roads, some of which would be transported to nearby perennial waterways.

In summary, this alternative would result in a slowly increasing amount of sediment production from unpaved Forest Service roads on the Coconino and south Kaibab National Forests over the next twenty years while project activities would be occurring. Contributions to this sediment would include increased motorized use over the next twenty years as maintenance falls behind and traffic increases, concentrated use on designated routes, and increased hauling and heavy machinery from landscape-scale forest restoration activities.

Although this alternative would cumulatively increase the amount of sediments available for transport to water bodies, the impact on water quality may not result in a change in water quality status at the watershed level. There are few perennial streams in the project area, so the potential is low that sediment yield from roads would actually enter water bodies.

Soil Resources

Since there are no direct or indirect impacts to soils from this alternative, there are no cumulative effects.

3.6.2.2 Alternative B - Proposed Action

Direct and Indirect Effects

Water Quality

Alternative B - Proposed Action proposes the construction of approximately 0.5 miles of temporary roads and improvement of 3.25 miles of existing roads, potentially affecting water quality. None of the proposed pits or expansion areas would directly impact streams. Two pits, Youngs Canyon and Dillman Expansion, are close to intermittent streams but are outside the required 50 foot buffer from existing streams.

Improvements to existing roads would likely reduce sediment yield from those roads due to better surfacing and improved drainage. The 0.5 miles of temporary roads would be on relatively flat ground, and are spread throughout both Forests, thus occurring in many different watersheds. There are approximately 8 proposed pit locations involving construction of temporary roads totaling 0.48 miles. This means each section of temporary road construction would average approximately 0.06 miles, which is expected to have very little impact at the watershed scale and therefore would not increase sediment yield. Similar to Alternative A - No Action, the amount of truck traffic (39,000 miles) would create some finer sediment on the road surface and would increase sediment yield; however this alternative would include approximately 30% less traffic from hauling and thus would likely result in decreased sediment yield from traffic based on existing conditions.

The higher potential for water quality impacts would be in those watersheds that are currently identified as impaired because of road/trail impacts. The Watershed Condition Framework identified a poor rating for the “roads and trails” parameter as a main factor affecting watershed function. The lower hauling costs, compared to Alternative A - No Action, would result in more miles of roads getting adequate surfacing than Alternative

A - No Action. Research clearly shows that unimproved road surfaces or unmaintained road surfaced produce more sediment loss from roads to the surrounding watershed and that this sediment travels a greater distance from the road surface (Grace and Clinton 2007). Thus, over the 20-year term of the project is it possible that water quality may be slightly improved from better average road surfacing on roads in the 31 watersheds identified as impaired and rated as poor for Roads.

The direct effects of Alternative B - Proposed Action would also include disturbing 230 acres of land to create new pits or expand existing pits. These pits would be internally draining and therefore would not generate any sediment yield to downstream perennial water sources because all the runoff would be captured by the pits. The main concern about increased sediment yields would be from the construction of the pits and facilities. Furthermore, the rock pit sites are distributed throughout the project area and thus occur scattered throughout each watershed, thus dispersing their potential effects. During construction, BMPs and the Resource Specific Protection Measures would be used to minimize sediment yield from the construction activities. No water bodies are directly at risk, therefore there would be very limited impacts to downstream water sources, primarily only occurring during the initial disturbance phase of pit development.

Soil Resources

Potential impacts to soils from Alternative B - Proposed Action include the removal of vegetation, mixing of soil horizons, soil compaction, increased susceptibility of soils to wind and water erosion, and loss of soil productivity. Increased soil erosion could be expected from areas disturbed by construction activities. Erosion would be most pronounced from areas having steep topography, but would generally be minimized as a result of required design criteria and BMPs. Topsoil would be salvaged and stockpiled for use in reclamation. Soil and gravel stockpiles would be subject to potential erosion but internally draining pits and BMPs would minimize erosion. An approved plan of operations are required for all pits that would include a reclamation plan, therefore, soil productivity would be restored over a period of time following reclamation efforts.

Direct and indirect effects to soil productivity would include removing the soil productivity from 230 acres of new pits or expansion of existing pits during pit development and operation. This impact would be temporary (during the operation of the pit, with a potential maximum of twenty years) because the topsoil would be salvaged and used in reclamation after pit operation. Soil productivity would be restored to most of the 230 acres of disturbance within a decade of reclamation efforts. It is estimated that it would take several years to re-establish a plant community with adequate cover and resistance to drought. It is likely up to ten percent of pit locations (approximately 23 acres) would remain unproductive because there would be rock walls, boulders to block vehicular access, or similar locations that would not be returned to productive sites.

Cumulative Effects

Water Quality

There are a number of current and future foreseeable activities that could impact water quality within the Coconino and Kaibab National Forests over the next 10 years (Appendix A). The effects of these activities would be similar as discussed for Alternative A - No Action. However, as compared to Alternative A - No

Action, Alternative B - Proposed Action would reduce the costs to surface and maintain roads as well as the driven from the existing pits. Therefore, more miles of road would be properly maintained and improved and. An increased mileage of road surfacing in each watershed would result in a decrease in sediment loss from surfaced roads (Grace and Clinton 2007).

The effects of temporary roads and the pits themselves would be negligible at the watershed scale and is not likely to result in cumulative effects with other activities since the effects are small and dispersed throughout the project area.

This alternative would decrease the production of sediment from unpaved Forest Service roads on the Coconino and south Kaibab national forests over the next ten years. Increasing traffic over the next decade would require additional sources of surfacing to maintain or improve water quality. Thus the effects of this alternative would likely reduce potential growing impacts from cumulative traffic as a result of hauling on both national forests over the next twenty years.

Soil Resources

The soil productivity impacts from Alternative B - Proposed Action would be limited to the new and expanded pit areas. These areas would be disconnected from the future foreseeable activities. There would be no cumulative effects on soil productivity from the combination of future foreseeable projects combined with Alternative B - Proposed Action.

3.6.2.3 Alternative C

Direct and Indirect Effects

Water Quality

The direct and indirect effects on water quality of Alternative C would be very similar to Alternative B - Proposed Action. The main differences would be that the amount of new disturbance is less at 219 acres (Table 4). Specifically, the Youngs Canyon pit would not be developed and approximately 7 existing rock pits would be reclaimed. The Youngs Canyon pit is adjacent to Walnut Canyon which is a perennial stream. Although no impacts to Walnut Canyon are expected in Alternative B - Proposed Action, the removal of Youngs Canyon from this alternative would reduce the potential for impacts to Walnut Canyon. None of the pits proposed for reclamation are close to perennial water sources. There would be no direct and indirect effects of Alternative C on water quality based on the rational described in Alternative B - Proposed Action.

Soil Resources

The direct and indirect effects on soil resources of Alternative C would be very similar to Alternative B - Proposed Action. The main differences would be that the amount of disturbance is less at 219 acres (Table 4) and that over the long-term soil productivity would increase on approximately 114.6 acres. Since many of the pits proposed from reclamation have been used for several years and lack top soil, it is expected that a return

to soil productivity on this 114.6 acres would take several decades. Therefore the direct and indirect effects of Alternative C would be less than Alternative B - Proposed Action.

Cumulative Effects

Water Quality

The cumulative effects of Alternative C on water quality are expected to be very similar to Alternative B - Proposed Action. Water quality is not expected to be cumulatively impacted by Alternative C based on the rationale described in Alternative B - Proposed Action.

Soil Resources

The cumulative effects of Alternative C on soil resources are expected to be similar to Alternative B - Proposed Action but have less impact. Soil Resources are not expected to be cumulatively impacted by Alternative C based on the rationale described in Alternative B - Proposed Action.

3.7 CULTURAL RESOURCES ---

3.7.1 CULTURAL RESOURCES EXISTING CONDITIONS

3.7.1.1 Coconino National Forest Overview

The Coconino National Forest has conducted an active program of cultural resources management and intensive archaeological surveys, resulting in documentation in both paper and electronic formats for about 10,000 archaeological sites. These sites cover the complete range of human activity known in the Southwest, ranging from isolated Clovis points, the earliest evidence for humans in the New World and dating to approximately 11,500 years ago, to an area used from 1968-1972 to train Apollo astronauts for their landing on the moon. These cultural resources are managed under three broad classifications: isolated occurrences, such as an arrowhead or an abandoned Model-T Ford; archaeological sites, such as a prehistoric pueblo or a pioneer's cabin; and traditional cultural properties, places of historical and cultural significance, such as the San Francisco Peaks or the Red Rock country near Sedona.

Evidence of human presence spans 11,500 years across numerous cultures. The earliest evidence that humans populated the area includes the rare Clovis points and sites used by hunter-gatherer during the Archaic period, dating to about 9,000 B.C. to A.D. 600. These sites are most likely to be found in the Sedona area. The majority of sites on the forest date from A.D. 600 to 1400 and represent various agricultural groups, including Northern and Southern Sinagua, Cohonina, Kayenta Anasazi, Winslow Anasazi, Hohokam, and Mogollon. The Sinagua culture was centered in the Flagstaff and Verde Valley areas and most of the sites representing the Northern and Southern Sinagua traditions are located on the Coconino National Forest. Sites of the Apache, Hopi, Navajo, Havasupai, Hualapai, Yavapai, and Zuni are fewer in number, in part because they are more difficult to recognize. The earliest Europeans were Spanish explorers who entered the Verde Valley in

1521. But it was not until the 1850s that ranchers, farmers, and loggers, representing many ethnicities and cultures, began to settle the land that today is the Coconino National Forest.

3.7.1.2 Kaibab National Forest Overview

The Kaibab National Forest Heritage Resource specialists have intensively inventoried approximately 23% of the District's 331,428 acres. To date, as a result of these surveys, 6 cultural resources have been placed on the National Register of Historic Places (NRHP) and 300 additional resources have been declared eligible for the NRHP. Approximately 60% of these sites are artifact scatters associated with the hunting and gathering camps ranging from ca. 9000 BC through the early Euro-American historic contact period ca. AD 1850.

3.7.1.3 Cultural Resources Survey Results

Cultural resources surveys were conducted at all proposed pit locations. However, to date not all pit sites have been documented in a survey report. Twenty-seven proposed pit sites have been surveyed and documented in two reports (Logan Simpson Design 2011 and 2012). Other sites have been surveyed but have yet to be included in a final report, which is in progress and will be completed prior to the publication of a final EA for this project. Of the surveyed and reported rock pit locations, there are ten locations with sites that would need to include mitigations to avoid impacts to cultural resources (Table 23). The most common mitigation to be applied would be for the site to be flagged and avoided of all rock pit development activities.

3.7.2 THE EFFECTS OF ALTERNATIVES ON CULTURAL RESOURCES

3.7.2.1 Alternative A - No Action

Direct and Indirect Effects

Although the continued use of existing pits could create some additional minor impacts to heritage resources from soil erosion or direct impacts from pit excavation, Alternative A - No Action would not have additional impacts to heritage resources beyond the existing conditions.

Cumulative Effects

The direct and indirect effects of Alternative A - No Action, combined with the effects of all present and reasonably foreseeable projects within the project area (Appendix A), would result in some minor impacts to heritage resources from soil erosion or direct impacts from pit excavation. This cumulative effect would likely be very minor because the rock pit sites have been surveyed and inventoried. However, there could be some additional impacts to undiscovered sites.

3.7.2.2 Alternative B - Proposed Action

Direct and Indirect Effects

Implementation of Alternative B - Proposed Action has the potential to directly affect cultural resources. The primary direct effects associated with the operations at the rock pits are ground-disturbance activities associated with the creation or expansion of the pits along with the potential of increased erosion, and unauthorized collection of artifacts or materials from heritage resource sites.

Ground-disturbance activities can damage or destroy surface features at heritage resource sites, disrupt behaviorally meaningful patterns in the surface artifact distribution, and disturb subsurface cultural deposits. This type of damage may result in the loss of cultural properties or sacred sites important to ongoing Native American or other traditional communities, the loss of scientific information concerning prehistoric and historical settlement in the region, or diminishment of those intrinsic qualities of a site that evoke a sense of linkage with the past.

Table 23. Results of 2011 and 2012 Cultural Resource Survey of 27 Pit Locations¹⁴.

Pit Name	Forest	Recorded Sites	Eligibility Determination	Recommended Mitigation
Big Aso	Kaibab	Lithic Scatter	Not Evaluated	Avoidance and/or Evaluation
Big Draw	Coconino	None	N/A	None
Big Ridge	Coconino	None	N/A	None
Crazy Cow	Kaibab	Road	Not Eligible	None
Davenport	Kaibab	None	N/A	None
Deadhorse	Kaibab	Rock Mound	Not evaluated	Avoidance and/or Evaluation
Dillman (1st site)	Kaibab	Multicomponent Habitation	Not evaluated	Avoidance and/or Evaluation
Dillman (2nd Site)	Kaibab	Artifact Scatter	Not Eligible	None
Dillman (3rd site)	Kaibab	Artifact Scatter/Historic Features	Not Eligible	None
Dog Knobs	Kaibab	None	N/A	None
Double A	Kaibab	Artifact scatter/habitation	Eligible, Criterion D	Avoidance and/or Evaluation
Fitzgerald	Kaibab	Artifact Scatter (Two sites)	Not Eligible	None
Fues	Kaibab	None	N/A	None
Hostetter 2 (1st Site)	Coconino	Artifact Scatter	Not Evaluated	Avoidance and/or Evaluation
Hostetter 2 (2nd Site)	Coconino	Field House	Recommended Eligible, Criterion D	Avoidance and/or Evaluation
Jackass Knoll	Kaibab	None	N/A	None
Kaibab 1A	Kaibab	Artifact Scatter/camp site	Not Eligible	None
Kaibab 2C	Kaibab	None	N/A	None
Kaibab 4A (1st site)	Kaibab	Artifact scatter with feature	Not Evaluated	Avoidance and/or Evaluation
Kaibab 4A (2nd site)	Kaibab	Brush Structure	Not Evaluated	Avoidance and/or Evaluation/Fire Sensitive due to wooden structure
Marteen	Kaibab	Agricultural/Habitation	Eligible, Criterion D	Avoidance and/or Evaluation
Moonset	Kaibab	None	N/A	None
Oak Grove	Coconino	Lithic Scatter	Not Eligible	None
Pittman Valley	Kaibab	None	N/A	None
Ruin	Kaibab	Habitation	Eligible, Criterion D	Avoidance and/or Evaluation
Salmon Lake	Coconino	None	N/A	None
Smoot Lake	Kaibab	None	N/A	None
Snafu	Coconino	Lithic Scatter	Eligible, Criterion D	None
W. Triangle	Kaibab	Lithic Scatter	Not Eligible	None
Williard Springs	Coconino	Railroad Bed	Previously determined Eligible, but segment near pit has been determined a non-contributing element.	None

¹⁴ Avoidance and/or evaluation = the site should be avoided if possible. If it can't be avoided, the site should be evaluated for significance and NRHP eligibility.

Erosion by mass wastage, slope wash, and wind can strip cultural deposits from archaeological sites, remove or displace artifacts, and undermine historical structures. Ground disturbances may accelerate erosion by damaging vegetation, loosening stable soil surfaces, and/or compacting soils and thereby promoting surface runoff. Vehicle tracks tend to channel surface runoff causing downcutting and increased soil erosion. The effects of accelerated erosion on heritage resources can be avoided or minimized by avoiding ground disturbance in the immediate site areas and locating areas of heavy traffic to avoid channeling runoff toward heritage resource sites.

The risk of unauthorized collection of artifacts increases due to the presence of project personnel in areas where the locations of heritage resource sites are clearly marked. Unauthorized removal of materials from heritage resource sites may result in the loss of sacred objects associated with Native American religious sites, or of artifacts needed to determine the age and nature of the occupation at prehistoric sites.

Sites that are eligible for the National Register of Historic Places (NRHP), or sites where the NRHP eligibility has not been determined, would be avoided to eliminate any direct effects to those resources. An inventory survey of the rock pits would be used to clearly mark any heritage resources found in the area. Project supervisors, equipment operators, and other key personnel would be briefed on the location of those resources and the need to avoid any impact to those resources would be emphasized. Project personnel would also be instructed about the adverse effects of artifact collecting and the legal penalties for unauthorized collection. Finally, project activities would be monitored to ensure full compliance.

There are several rock pit locations with isolated occurrences that are not considered eligible for the NRHP because the information potential of these isolated occurrences has been exhausted. These areas would not be avoided and would be subject to the direct effects discussed above.

To meet its responsibilities under Section 106 of the NHPA, the USDA Forest Service would flag and fence the identified cultural sites to protect them from direct impacts. Mechanical equipment and workers would be kept out of the protected areas. The inadvertent discovery of historic or prehistoric material is possible. If an archaeological discovery is made all work would stop within 100 feet, the Ranger District, Zone Archeologist and Forest Archeologist would be notified.

Some direct impacts to heritage resources that do not meet the National Register criteria could result from the proposed activities; however, because these sites are not significant, the impacts would be considered less than significant.

Cumulative Effects

Appendix A includes all present and reasonably foreseeable projects within the project area that would have potential cumulative effects on cultural resources. Direct and indirect effects of Alternative B - Proposed Action combined with the effects of all present and reasonably foreseeable projects within the project area, would result in some impacts to cultural resources. Because these impacts would be to heritage resources that do not meet the National Register criteria, the impacts would be considered less than significant.

3.7.2.3 Alternative C

Direct and Indirect Effects

The direct and indirect effects of Alternative C would be essentially the same as those described under Alternative B - Proposed Action. The Youngs Canyon pit would not be part of this alternative, therefore, there would be fewer potential impacts. However, with the mitigation measures that are required to protect cultural sites, there would be no significant impacts from the implementation of Alternative C.

Cumulative Effects

Appendix A includes all present and reasonably foreseeable projects within the project area that would have potential cumulative effects on cultural resources. Direct and indirect effects of Alternative C combined with the effects of all present and reasonably foreseeable projects within the project area, would result in some impacts to cultural resources. Because these impacts would be to heritage resources that do not meet the National Register criteria, the impacts would be considered less than significant.

3.8 ECONOMICS

3.8.1 EXISTING CONDITIONS FOR ECONOMICS

3.8.1.1 Communities in the Project Vicinity

There are multiple communities within or near the project area including Williams, the Verde Valley, Flagstaff and Sedona. Flagstaff is the largest of these communities with approximately 60,000 residents (47% of the residents of Coconino County) live there. Table 24 provides information on the socio-demographics of Flagstaff. Most economic activity is generated by the government sector, with Northern Arizona University, USDA Forest Service and National Park Service offices located in Flagstaff. Per capita income for Flagstaff residents is about \$23,000 annually, and nearly one in five residents (18.3%) have income below the poverty level. Most residents in Flagstaff are White (72.6%), followed by Hispanic or Latino (18.0%), followed by American Indian or Alaska Native (12.4%). About three-fourth's (73.3%) of the Flagstaff population is in the labor force.

Table 24. Socio-demographic Characteristics of City of Flagstaff¹⁵.

Characteristic	Number/Percentage
Population	59,820
Annual per capita Income	\$22,598
Individuals below poverty level	18.3%
Population self-reported as White	72.6%
Population self-reported as Hispanic or Latino (of any race)	18.0%
Population self-reported as American Indian or Alaska Native	12.4%
Population in the labor force	73.3%
Population 65 years or older	6.0%
Median Value of owner-occupied homes	\$304,800

In contrast, the community of Sedona is a smaller, more affluent, and more tourism oriented. It has about 10,000 residents, and only about one in ten (11.3%) live below the poverty level (Table 25). Sedona residents are predominantly White (92.1%), with much lower proportions of Hispanic or Latino (13.0%) and American Indian or Alaska Native (0.4%) residents compared to Flagstaff. The majority of economic activity is generated in the retail sector (Citydata.com 2011), and slightly more than half (56.6%) of Sedona residents are in the labor force.

Table 25. Socio-demographic Characteristics of Sedona¹⁷.

Characteristic	Number/%
Population	11,405
Annual per capita income	\$42,790
Individuals below poverty level	11.3%
Population self-reported as White	92.1%
Population self-reported as Hispanic or Latino (of any race)	13.0%
Population self-reported as American Indian or Alaska Native	0.4%
Population in labor force	56.6%
Proportion of Population 65 years or older	24.5%
Median Value of owner-occupied homes	\$518,100

¹⁵ Source: U.S. Census Bureau, 2005-2009 American Community Survey

¹⁶ Proportions of self reported White and Hispanic or Latino categories do not sum to 100% since Hispanic and Latinos can be one or more races.

¹⁷Source: U.S. Census Bureau, 2005-2009 American Community Survey

3.8.1.2 Counties in the Project Area

The project area overlaps with Coconino and Yavapai counties. Tables 26 and 27 present summary socio-demographic information for each county. Coconino County has about 127,000 residents. Many of its other socio-demographic characteristics are similar to those in Flagstaff. The per capita income is about \$22,000 annually. About three-fourths (72.6%) of the population is White, followed by American Indian or Alaska Native (28.8 %), followed by Latino or Hispanic (18%). Almost one in five individuals (17.4%) has an income below the poverty line.

The population of Yavapai County is nearly twice as large as that of Coconino County, with about 210,000 residents (Table 27). Annual per capita income is about 10% higher than that of Coconino County at about \$25,000. The proportion of the population that is White is also higher than for Coconino County at about 90%. About 13% of individuals have incomes below the poverty line.

Table 26. Socio-demographic Characteristics of Coconino County.

Characteristic	Number/Percentage
Population	127,312
Annual per capita Income	\$22,238
Individuals below poverty level	17.4%
Population self-reported as White	72.6%
Population self-reported as Hispanic or Latino (of any race)	18.0%
Population self-reported as American Indian or Alaska Native	28.8%
Population in work force	67.9%
Population 65 years or older	7.9%
Median value of owner-occupied homes	\$254,700

Table 27. Socio-demographic Characteristics of Yavapai County¹⁸.

Characteristic	Number/Percentage
Population	209,365
Annual per capita Income	\$25,458
Individuals below poverty level	12.7%
Population self-reported as White	90.4%
Population self-reported as Hispanic or Latino (of any race)	12.6%
Population self-reported as American Indian or Alaska Native	1.8%
Population in work force	55.1%
Population 65 years or older	22.6%
Median value of owner-occupied homes	\$232,700

¹⁸ Source: U.S. Census Bureau, 2005-2009 American Community Survey

3.8.2 THE EFFECTS OF ALTERNATIVES ON ECONOMICS

This section describes the effects of Alternative A - No Action, Alternative B - Proposed Action and Alternative C.

3.8.2.1 Effects Common to All Alternatives

For all alternatives, there would be costs, specified below and reported as NPV, associated with rock pit activity and road work under each alternative. Additional direct effects would include short-term noise, dust, traffic impacts on the roads used as rock pit haul routes. Finally, there would be indirect beneficial effects such as reduced erosion and decreased sediment in water quality, and improved recreation or public access over the long-term, and reduced degradation of wildlife habitat under each alternative.

3.8.2.2. Alternative A - No Action

Direct Effects and Indirect Effects

Direct effects include the net present value of the costs associated with rock pit activity and road work, and potential impacts to minority and low income populations. Hauling costs per cubic yard (cy) would be highest under Alternative A - No Action. As shown in Table 28, the average annual costs for all rock pit activities would be \$918,678, and are based on assumption that 32.3 miles of annual road work would occur. Finally, there would not be any reclamation activities and therefore no reclamation costs would be associated with Alternative A - No Action. Over the 20-year planning period the Net Present Value of all costs incurred for Alternative A - No Action would be approximately \$12.9 million.

Table 28. Costs and Roadwork Completed Summary by Alternative¹⁹.

Cost Categories	Alternative A - No Action	Alternative B - Proposed Action	Alternative C
Development	\$0	\$706,675	\$706,675
Off forest purchase	\$441,672	\$0	\$0
Hauling	\$477,066	\$119,251	\$119,251
Reclamation	\$0	\$0	\$38,200
Average annual cost	\$918,678	\$825,927	\$864,127
NPV	-\$12,984,536	-\$11,673,597	-\$12,213,514
Miles of roads improved per year	32.3	32.3	32.3

Environmental Justice Analysis

As stated previously, Executive Order 12898 requires federal agencies to evaluate the environmental and human health effects of its activities on minority and low income populations. Table 29 displays ethnic group

¹⁹ Costs are for average annual costs for a 20-year planning period (Appendix A). Miles of roads improved per year are from the Roads, Traffic, Safety and Air Quality Specialist Report for the Rock Pits Environmental Assessment (JW Associates 2013).

categories and the proportion of individuals below the federal poverty level for the two counties in the project area, and compares these characteristics with Arizona statewide data. Impacts would be considered significant if two conditions are met: 1) there are a disproportionate amount of minority or low income individuals living in close proximity to the project area, and 2) those populations are adversely affected by human health or environmental impacts associated with project activities. Table 29 shows that for Coconino County there is a slightly higher proportion of individuals living below the poverty level compared to residents of Yavapai County and for Arizona as a whole. This is likely due to the student population of approximately 25,000 persons living in Flagstaff at least nine months a year. Therefore, potential impacts to individuals below the poverty line are not evaluated further.

Table 29. Comparison of Ethnic Status and Poverty Levels with Statewide Characteristics²⁰.

Characteristic	Coconino County	Yavapai County	Arizona
White	60.8%	90.4%	77.6%
Black or African American	1.2%	0.7%	3.6%
American Indian	28.8%	1.8%	4.5%
Asian	1.2%	0.7%	2.4%
Latino or Hispanic (of any race)	12.5%	12.6%	29.8%
Individuals below the poverty level	17.4%	12.7%	14.7%

Coconino County also has a disproportionately high population of American Indians, relative to the state as a whole, and thus the native American population of Coconino County is considered a minority group. Potential impacts to American Indians include traffic, noise and air quality (dust) impacts. These potential impacts would occur to American Indians using Forest Roads used for rock pit access or hauling activities. The potential impacts to American Indians are not expected to be in any way disproportionate compared to these same potential impacts on other Forest users. Impacts would occur two to three weeks a year when processing, mining, and hauling activities are occurring, most likely six to seven trucks making three trips (originating off national forest lands to purchase roadbed materials) daily for eight to ten days per year. However, given the short-term nature of these activities, traffic, noise, and dust impacts to American Indian populations would be temporary in nature and limited to the specific haul routes being used.

Indirect effects of Alternative A - No Action would include reduced erosion and improved water quality, public access, and wildlife habitat. The relative impacts of each alternative on these values are compared in Table 30, which shows that the No Action Alternative would have the lowest beneficial effects compared to Alternatives B and C.

Alternative A - No Action would have the lowest levels of beneficial impacts to resource values since it would improve the fewest miles of road miles per year. As a result, fewer areas would have improved public access,

²⁰ Census Bureau, American Community Survey, 2005-2009

and fewer areas would have adequate access where forest restoration activities (improved wildlife habitat) are targeted, and to reach areas where reducing wildfire hazards are planned.

Table 30. Beneficial Impacts to Resource Values²¹.

Resource Value	Alternative A - No Action	Alternative B - Proposed Action	Alternative C
Reduced erosion/improved water quality	1	2	3
Improved public access	1	2	2
Improved wildlife habitat	1	2	3
Reduced wildfire hazard	1	2	2

Cumulative Effects

There are numerous current and reasonably foreseeable projects (Appendix A) that, when combined with the direct and indirect effects of Alternative A - No Action, would create cumulative impacts to economic resources. The rock pits costs for Alternative A - No Action are approximately \$1,132 million over a 20-year planning period, or \$918,678 on an average annual basis. The average annual hauling costs for Alternative A - No Action would be more than four times as much as the hauling costs associated with Alternatives B and C. The cost per mile of road improvements associated with present and reasonably foreseeable projects would be highest under Alternative A - No Action due to the need to transport roadbed material from off-Forest locations to project sites. When the higher road improvement cost is considered for Alternative A - No Action and the other present and reasonably foreseeable projects, there would be cumulative impacts to economic resources.

There also would be cumulative impacts associated with the direct and indirect effects of dust, traffic, and noise experienced by public users of Forest roads. These effects would occur under situations when haul routes are being used concurrently by public users of the same roads.

3.8.2.3 Alternative B - Proposed Action

Direct and Indirect Effects

Alternative B - Proposed Action would not incur costs for the purchase of roadbed materials, but instead would incur material mining and processing costs. As shown in Table 28, the average annual cost for this activity would be approximately \$825,927. Relative to Alternative A - No Action, hauling costs would be much lower due to the lower number of miles hauled. Alternative B - Proposed Action does not propose reclamation activities so there would not be any additional costs for that activity. The PNV of Alternative B - Proposed Action would be about \$11.7 million.

²¹ Beneficial impacts to resource values are ranked in the following manner: 1=lowest benefit, 2=second lowest/second highest, and 3=highest benefit.

There would be indirect beneficial impacts under this alternative (Table 30). Similar to the No Action alternative, these effects would include reduced erosion, improved water quality, improved public access, and improved wildlife habitat.

Environmental Justice Analysis

As stated for Alternative A - No Action, there are potential individuals living in these areas who would experience noise, traffic, and dust impacts during about two to three weeks a year when processing, mining, and hauling activities are occurring. However, these activities would only occur at up to three pits in any given year, and therefore a small proportion of the total Forest Road mileage would be used. Hauling and the associated noise and dust would have potential to cause impacts, since it would involve eight to ten trucks making three trips per day from a rock pit to the road requiring maintenance activity from up to three rock pits. If hauling is occurring along roads adjacent to private homeowners or on roads used by forest visitors, there are potential traffic, noise and dust impacts. However, given the short-term nature of these activities, traffic, noise, and dust impacts to American Indian populations would be temporary in nature and limited to the specific haul routes being used.

Cumulative Effects

The road improvement costs for Alternative B - Proposed Action would be \$825,927, almost \$100,000 less than the Alternative A - No Action. Therefore, the cost per mile of road improvements would also be less under for this alternative. As a result when this project is considered along with all present and reasonably foreseeable projects, there would be positive cumulative effects because the cost per mile for road improvements would decrease as compared to no action. There would be cumulative effects associated with the direct and indirect effects of dust, noise, traffic on the Coconino National Forest. Other projects would benefit from reduced costs of road surfacing materials.

3.8.2.4 Alternative C

Direct and Indirect Effects

Development costs for Alternative C would be slightly more than Alternative B - Proposed Action (Table 28) due to the cost of reclaiming about 114 acres of pits, at an average cost of \$10,000 per acre. Net present value of all costs over the 20-year planning period would be about \$12.2 million.

There would be indirect beneficial impacts under this alternative (Table 30). Similar to Alternative B - Proposed Action, these effects would include reduced erosion, improved water quality, improved public access, and improved wildlife habitat.

Environmental Justice Analysis

The effects to environmental justice would be the same as discussed for Alternative B - Proposed Action.

Cumulative Effects

The cumulative effects to economics would be similar to those discussed for Alternative B - Proposed Action. Total costs would be slightly greater because of the costs of reclamation.

3.9 SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

The short-term uses associated with each alternative would not result in a loss of long-term air quality (dust), water quality, recreational opportunity, or other forest-based resource. Actions for all alternatives would be temporary, with some impacts (e.g. loss of vegetation cover at rock pit sites and temporary road locations) lasting up to 20 years in duration. More intensive impacts from rock pit blasting, hauling, and crushing would have a duration limited to several weeks a year for hauling activities, and six to eight weeks a year for rock mining and processing activities.

The short-term uses associated with rock pit activity may result in permanent closure of some rock pits that currently provide recreation opportunities, such as recreational shooting (OHV use is prohibited under the recent travel management decisions). However, the overall supply of recreation opportunities associated with rock pits would not be substantially reduced and recreationists that desire to use rock pits for various forms of recreation would still have many options available on both national forests. There would not be a reduction in long-term productivity in terms of the Project Area providing sufficient rock pit areas to meet recreation demand.

The short-term uses associated with rock mining, processing, and transport would not affect visual resources long-term, where long-term is considered 20 years after reclamation. As the operations at the rock pits are complete, the pits are to be reclaimed. The goal of reclamation is to enable the proposed pit locations to eventually blend into the existing landscape.

The short-term uses would include some impacts on soil productivity associated with each alternative and potentially some increased sediment yields. Reclamation activities would restore most of the soil productivity in the long-term. Water quality would not be impacted.

The National Environmental Policy Act (NEPA) requires consideration of “the relationship between short-term uses of man’s environment and the maintenance and enhancement of long-term productivity” (40 CFR 1502.16). As declared by Congress, this includes using all practicable means and measures, including financial and technical assistance, in a manner calculated to foster and promote the general welfare to create and maintain conditions under which man and nature can exist in productive harmony and fulfill the social, economic, and other requirements of present and future generations of Americans (NEPA Section 101).

As provided for by the Forest Plans, specific standards, objectives, and guidelines would be applied during implementation of Alternatives B and C (Proposed Action and Alternative) through the use of specific design criteria. Adherence to these requirements would ensure that long-term productivity of the land is not impaired by short-term uses. There would be short-term impacts on vegetation, habitat, and fish and wildlife species.

Monitoring conducted at the Forest level would be implemented to allow for adaptive management of the resources in order to protect long-term productivity.

The short-term uses associated with each alternative would not result in a loss of long-term cultural resources. Mitigation measures would protect significant cultural resources.

The short-term uses associated with each alternative would not result in a loss of long-term air quality (dust), traffic, and noise levels. Actions for all alternatives would be temporary and the duration limited to several weeks a year for hauling activities, and six to eight weeks a year for rock mining and processing activities.

3.10 UNAVOIDABLE ADVERSE EFFECTS ---

For Alternatives B and C there would be unavoidable adverse effects to vegetation that would be removed for the new and expanded pit areas.

For all alternatives there would be short-term unavoidable effects to traffic and air quality. However, as stated above these effects would be short-term, temporary and therefore less than significant.

During times of pit activity, access to some desired recreation areas may be disrupted. During these times short-term, unavoidable adverse effects could occur to some recreationists. If rock pits currently used for recreation are permanently closed (either due to reclamation or for public safety reasons) then these closures would have unavoidable adverse effects to users of these particular rock pits.

There would be unavoidable adverse effects during the times pits are being actively used particularly where pits are within 0.5 miles from major travelways or scenic highways making them highly visible to passing motorists. There are additional pit locations within 0.5 miles of developed recreation facilities or trails. Some individuals who view these active pits as they are driving or recreating would experience short-term, temporary, but unavoidable adverse effects.

For all alternatives there would be short-term unavoidable effects to soil productivity. However, as stated above these effects would be short-term, temporary and therefore less than significant.

There would be irreversible or irretrievable impacts on wildlife resources with implementation of either action alternative due to the designation of 229 acres of new disturbance in Alternative B - Proposed Action and 218 acres of new disturbance in Alternative C. In addition, under both alternatives there would be nearly 0.5 mile of new temporary roads and 3.25 miles of road improvement. Habitat in these locations would be unavailable for wildlife use for the near term. Site restoration may allow for wildlife use after the project is complete and restoration has been implemented, but full restoration of site vegetation and habitat is not guaranteed.

For all alternatives there would be unavoidable effects cultural resources that are not NRHP eligible.

Under Alternatives B and C there would be short-term unavoidable effects to air quality, noise, traffic levels on roads used by American Indians, and noise levels along those same roads. However, as stated above these effects would be temporary in nature and limited to the specific haul routes being used.

3.11 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

For all alternatives, there would not be an irreversible or irretrievable commitment of resources. All pit areas would eventually be reclaimed.

Roads used to access the pits would be improved over the 20-year planning period, resulting in indirect beneficial impacts to water quality, wildfire hazard reduction, public access, and wildlife habitat.

Permanent closures of rock pits that provide recreation opportunities would result in an irreversible commitment of some recreation opportunities. However, as stated above, the overall supply of recreation opportunities associated with rock pits would not be substantially reduced and recreationists that desire to use rock pits for various forms of recreation would still have many options available on both national forests.

There would not be an irreversible or irretrievable commitment of resources. Visual features would be temporarily changed, resulting in some short-term, adverse impacts, as described above. However, these effects would be fairly limited in size and over a number of years. Over the long-term as rock pits are reclaimed, visual impacts would become either neutral or beneficial.

For all alternatives, there would not be an irreversible or irretrievable commitment of resources. All pit areas would eventually be reclaimed. Roads used to access the pits would be improved over the 20-year planning period, resulting in indirect beneficial impacts to water quality.

Irreversible commitments of resources are those that cannot be regained, such as the extinction of a species or the removal of mined ore. Irretrievable commitments are those that are lost for a period of time, such as the temporary loss of timber productivity in forested areas that are kept clear for use as a power line right-of-way or road.

There would be no irreversible or irretrievable commitments of resources related to fish and wildlife species or their habitats under Alternative A - No Action. Under Alternative B - Proposed Action, there is limited potential for loss of individuals due to project activities; however, the population levels of the species on the Forest level should not be significantly impacted. Loss of old growth could also represent an irretrievable loss of habitat; pinyon-juniper old growth stands are located on a portion of the proposed Marteen rock pit site.

For all alternatives, there would be some irreversible or irretrievable commitment of resources to cultural resources that are not NRHP eligible.

For all alternatives, there would not be an irreversible or irretrievable commitment of resources. All pit areas would eventually be reclaimed. Roads used to access the pits would be improved over the 20-year planning period, resulting in indirect beneficial impacts to water quality, public access, and wildlife habitat.

3.12 CONSISTENCY WITH ENVIRONMENTAL LAWS _____

For all alternatives the effects on air quality would be consistent with environmental laws including the Clean Air Act.

The actions and effects considered in this analysis are consistent with environmental laws and would not violate any environmental laws pertaining to recreational resources such as the Wilderness Act or the Wild and Scenic Rivers Act.

The Proposed Action and alternatives have been developed to protect visual resources and are therefore consistent with the National Trail Systems Act, National Forest Management Act, and the Intermodal Surface Transportation Efficiency Act.

For all alternatives the effects would be consistent with environmental laws related to water quality including the Clean Water Act.

For all alternatives the effects to cultural resources would be consistent with environmental laws including the NRHP.

For all alternatives the effects on economic resources and environmental justice would be consistent with environmental laws (Clean Air Act, Clean Water Act) that protect human health of populations living in or near the project area. They would also be consistent with Executive Order 12898.

3.13 CONSISTENCY WITH FOREST PLAN _____

The effects of all alternatives on roads, traffic, safety and air quality would be consistent with the Forest Plans for each forest.

Proposed treatments would not permanently alter developed recreation areas, day use areas, camping areas, or trails. The actions and effects considered in this analysis are consistent with Forest Plan direction for recreation for both forests.

For rock pits located in areas with a “High” SIO, the pit development would be inconsistent under conditions when recreationists could view mining activity at distances of 0.5 miles or less. This situation is allowed under the Coconino National Forest Plan since the plan allows for “one classification movement downward... (Forest Service 2008, p. 60)”. This proposal would include moving 3.2 acres of land at the Hostetter 2 Pit one classification downward, from High to Moderate Scenic Integrity.

The effects of all alternatives on soils and water quality would be consistent with the Forest Plans for each forest.

The Coconino National Forest Plan (US Forest Service 1987) determines standards and guidelines for snags and downed logs, wildlife cover, raptor nest buffers, old growth, turkey nesting and roosting habitat, and bear habitat. It also incorporates the Mexican Spotted Owl Recovery Plan and Northern Goshawk Management Recommendations. Similarly, the Kaibab National Forest Plan (US Forest Service 1988) incorporates standards

and guidelines for Mexican Spotted Owl and ecosystem management in northern goshawk habitats. The Kaibab plan also includes guidelines for wildlife and fish resource operations and improvements.

The action alternatives would not be in compliance with Forest Plan guidelines for the management of the northern goshawk as stated in the Forest Plan (Amendment #6 October 1996 – pg. 9). Specifically, guidelines for management of the northern goshawk in ponderosa pine habitat limit forest openings to four acres and suggest that each acre have two snags. As a result, approval of pits larger than four acres under either Alternative 2 or 3 would require a project-specific amendment to the Forest Plan to address this issue. All the pit areas, except for one, would be over four acres in size. The Proposed Action is consistent with all other objectives, standards, and guidelines provided in the Forest Plans and subsequent amendments.

The effects of all alternatives on cultural resources would be consistent with the Forest Plans for each forest.

The effects of all alternatives on economic resources and environmental justice would be consistent with the Forest Plans for each forest.

3.14 WETLANDS

There would be no direct or indirect impacts to wetlands in the Rock Pits Project Area.

3.15 FLOODPLAINS

There would be no direct or indirect impacts to floodplains in the Rock Pits Project Area.

Chapter 4.

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Appendix A

Current and Reasonably Foreseeable Actions for the Rock Pits Cumulative Effects Analysis

Table A-1. Current and Reasonably Foreseeable Actions for the Rock Pits Cumulative Effects Analysis

Project Name	Description	Location	Agency or Organization	Status
Coconino National Forest Motorized Travel Management Plan EIS	Designate a system of roads, trails, and areas that will be open to public motorized use on the Coconino National Forest.	Coconino National Forest	USDA Forest Service	Decision 9-11
Four Forest Restoration Initiative EIS: South Kaibab and Coconino	Implementation of forest restoration activities including thinning of trees and prescribed fire treatments within 724,000 acres on the Kaibab and Coconino national forests.	Coconino and Kaibab National Forests	USDA Forest Service	Decision 6-12
Flagstaff to Pinnacle Peak Transmission Line Vegetation Management	Expand vegetation management, including tree removal, for a distance up to 150-feet on either side of the existing 345kV line traversing the Coconino National Forest. Purpose is to increase transmission line reliability per the 2005 Energy Policy Act	Coconino National Forest	USDA Forest Service	Implementation 2-12
Grapevine Interconnect (Grapevine Canyon Wind Project)	Approximately 9 miles of new 345kV electric transmission line connecting a new wind park located on Flying M Ranch private property to the existing Western Area Power Authority (Western) 345kV line.	Mormon Lake Ranger District, Coconino National Forest	Western Area Power Authority	Being implemented
Yellow Jacket Rock Pit #2 Use 2011	Use of the existing pile of cinders and clay fill at Yellow Jacket Pit #2. Materials that are available are in two stockpiles and have an estimated volume of 1,000 cubic yards. No further development of the pit will occur.	Mormon Lake Ranger District, Coconino National Forest	USDA Forest Service	Implementation 8-11
APS Sandvig-Youngs Powerline	Proposal by Arizona Public Service to expand existing powerline corridors to allow construction of a new 69kV powerline between the Sandvig and the new Youngs substation east of Flagstaff. Along the existing APS and WAPA line approx 40 feet width.	Peaks Ranger District, Coconino National Forest	Arizona Public Service	Decision 6-11
McCormick Cell Tower Power Line	Amend existing special use permit to Arizona Power Supply (APS) to install and operate a 4,356-foot 12kV powerline and 20-foot wide ROW parallel to forest road 742 to provide power to the McCormick Cell tower on private land.	Peaks Ranger District, Coconino National Forest	USDA Forest Service	Implementation 10-11
McCormick Pit Native Material Site	Proposal by Coconino County obtain a permit to continue disposing of native dirt and rock flood debris in the McCormick Pit.	Peaks Ranger District, Coconino National Forest	Coconino County	Implementation 9-11
Clints Well Forest Restoration Project	Fuel reduction & ecosystem restoration over approximately 16,809 acres within and adjacent to the WUI of Clints Well.	Mogollon Rim Ranger District, Coconino National Forest	USDA Forest Service	Implementation 2-12

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Project Name	Description	Location	Agency or Organization	Status
Blue Grade Storage Area Amendment	Proposal to revise the boundary of ADOT's material storage area at the Blue Grade Pit	Red Rock Ranger District, Coconino National Forest	ADOT	Being implemented
Yavapai Apache Water Tank Site Expansion	Proposal to add acreage to the permit area for the water tank site in order to allow for disposal and reshaping of waste dirt from the new water tank construction.	Red Rock Ranger District, Coconino National Forest	USDA Forest Service	Being implemented
Tobias/Flynn Road Access	Proposal to construct a road from SR179 to private property across Oak Creek from Poco Diablo and Chavez Crossing Group Campground in Sedona. Proposal is the result of litigation requiring the Forest Service to provide an easement.	Red Rock Ranger District, Coconino National Forest	USDA Forest Service	Decision 1-12
Oak Creek Water Co Pipeline	Proposal to reissue a permit for an existing water pipeline and increase right of way width from 10 feet to 20 feet to add an additional pipeline in the Sedona area.	Red Rock Ranger District, Coconino National Forest	Oak Creek Water Co	Decision 3-12
Cancoop Vegetation Management & Wildlife Habitat Improvement Project	Prescribed burning on approximately 6230 acres to improve timber stand and vegetative structure.	North Kaibab Ranger District, Kaibab National Forest	USDA Forest Service	Decision 9-11
Jacob-Ryan Vegetation Management Project	The JR Vegetation Mgt. Project is located in the North central portion of North Kaibab Ranger District. Forest Restoration that facilitates forest ecosystem sustainability by changing the structure of even-aged stands toward uneven-aged.	North Kaibab Ranger District, Kaibab National Forest	USDA Forest Service	Decision 8-11
Moquitch Wildlife Habitat Improvement Project	Thinning of small diameter tree < 12.0" DBH on 500 acres, followed by prescribed burning on approximately 9,500 acres, to improve vegetative structure for wildlife habitat. Treat up to 5,000 acres a year, dependent on weather conditions and budget.	North Kaibab Ranger District, Kaibab National Forest	USDA Forest Service	Implementation 9-11
North Kaibab Travel Management Project	Identify and establish a motorized road system on the North Kaibab Ranger District and publish a motorized vehicle use map	North Kaibab Ranger District, Kaibab National Forest	USDA Forest Service	Implementation 9-11
Plateau Facility Fire Protection Project	Fuels reduction project at multiple sites on the North Kaibab Plateau	North Kaibab Ranger District, Kaibab National Forest	USDA Forest Service	Implementation 11-11
Rainbow Rim Extension	Conversion of up-to seven (7) miles of unimproved road (i.e., old unused timber road) to a hiking and biking trail.	North Kaibab Ranger District, Kaibab National Forest	USDA Forest Service	Implementation 10-11

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Project Name	Description	Location	Agency or Organization	Status
Highway 64/180 Wireless Communication Sites Project	Const. a self-supported tower, up to 150' tall, at the existing Tusayan Comm. Site. Const. a 150' tall tower on the east side of Hwy 64 six miles south of Tusayan in T29N, R2E Section 24. Modify the KNF Forest Plan to designate the two Comm Sites.	Tusayan Ranger District, Kaibab National Forest	USDA Forest Service	Implementation 8-11
Russell Vegetation Management Project	Non-commercial thinning and burning on approx. 8,000 acres.	Tusayan Ranger District, Kaibab National Forest	USDA Forest Service	Implementation 7-11
Aspen Restoration Project	Protect and restore aspen stands by thinning competing conifers and protecting regenerating aspen from ungulate browsing.	Williams Ranger District, Kaibab National Forest	USDA Forest Service	Implementation 6-11
Bill Williams Mountain Restoration Project	The purpose of the project is to improve the health and sustainability of forested conditions on and surrounding Bill Williams Mountain by reducing hazardous fuels and moving vegetative conditions in the project area toward desired conditions.	Williams Ranger District, Kaibab National Forest	USDA Forest Service	Implementation 4-12
McCracken Project	Vegetation Management and Fuels Reduction Project	Williams Ranger District, Kaibab National Forest	USDA Forest Service	Implementation 6-11